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ABSTRACT

Presented are four studies of the effectiveness of early childhood programs that were implemented in the Pasco, Washington school district from 1982 through 1987. Part One provides a study of three kindergarten models, full-day everyday, full-day alternate days, and half-day everyday, implemented during the 1985 school year. The study reports on the preschool program over a 3-year period. Part Two reports on a comparison of two kindergarten models, half-day everyday and full-day alternate days, for the 1986 school year. Included in the report is data from other studies comparing half-day and alternate day schedules. Part Three compares the full-day everyday kindergarten model, as operated for the school years 1986 and 1987, to the half-time kindergarten models, which combine half-day everyday and full-day alternate days. It also reviews data from other studies of full-day kindergarten models. Part Four provides data on five cohorts of preschool children, served from 1982 through 1987, with follow-up data on the first two cohorts through kindergarten and first grade. Findings indicate that the full-day everyday kindergarten program was far more effective than the half-time models for poverty level students and average or above average students. The full-day alternative days model was significantly better than the half-day everyday model for children in poverty, and on all tests of language proficiency. (RH)

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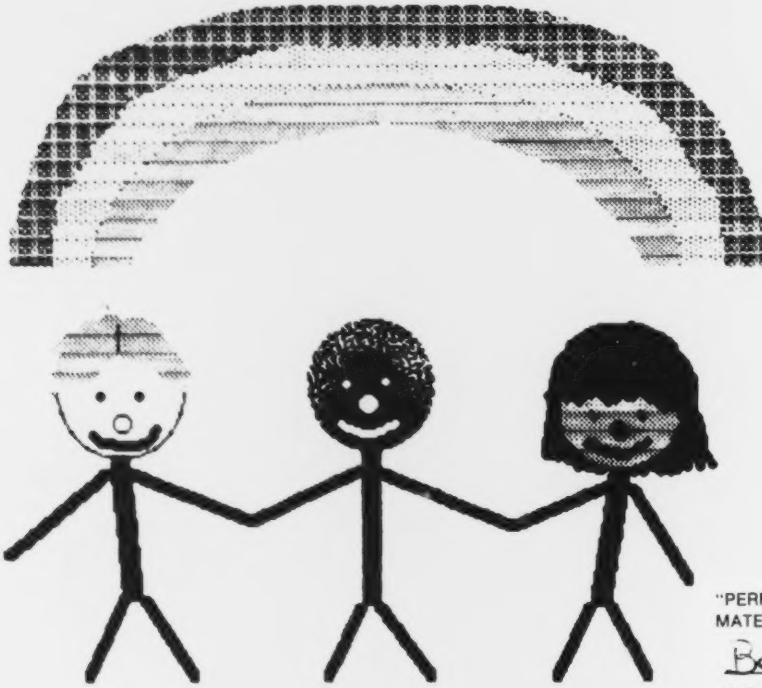
# PASCO PUBLIC SCHOOL'S

# EARLY CHILDHOOD PROGRAMS STUDIES



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# EFFECTIVENESS OF PRESCHOOL

# AND

# COMPARING FULL-DAY HALF-DAY AND ALTERNATE-DAY

# KINDERGARTENS

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Questions about this study or
further information should be
directed to:

Stephanie Tesch, Assistant Supt.
Pasco School Dist. No. 1
1003 North 16th Avenue
Pasco, WA 99301

509-547-9531 or

Dr. Beverly B. McConnell
Research and Evaluation Office
Bilingual Mini Schools
S.W. 615 Cityview
Pullman, WA 99163

509-334-2750

Dr. McConnell has a master's degree in child development and a Ph.d in educational research and evaluation. She has directed two national evaluations--one involving the Follow Through program on six Indian Reservations; the other the evaluation of mobile programs for the education of children of migrant farm workers. She is the evaluator for the State of Washington's Early Childhood Education and Assistance Program, a state-wide program similar to Head Start that was initiated in 1986. And she has done numerous evaluations of educational programs for Pasco and other school districts over the past twenty years.

## PREFACE

This volume contains four studies of the effectiveness of early childhood programs carried out in Pasco School District from 1982 through 1987.

PART ONE is a study of three kindergarten models, full-day every-day, full-day alternate-day, and half-day every day during the 1985 school year. It also reports on the preschool program over a three year period, 1982-85. pp 1 - 55.

PART TWO is a comparison of two kindergarten models, half-day every-day and full-day alternate days for the 1986 school year. This includes comparative data from other studies comparing half day and alternate day schedules. pp 56 - 68

PART THREE compares the full-day every-day kindergarten model as operated for the school years 1986 and 1987 to the half time kindergarten models, combining half-day every-day and full-day alternate-day. It also reviews data from other studies of full-day kindergarten models. pp 69 - 90

PART FOUR provides data on five cohorts of preschool children, served 1982 through 1987, with follow-up data on the first two cohorts through kindergarten and first grade. pp 91 - 102

REFERENCES for other studies is given on pp 103 - 105.

## ii.

## MAJOR FINDINGS OF THE FOUR STUDIES

The full-day every-day kindergarten program is far more effective than the half-time models, when comparable children were placed in the different models.

The full-day every-day kindergarten is effective both for poverty level children, and for average or above average students. The 1986-87 combination of "gifted" or very able students, and at risk students is effective for both.

Between the two half-time models, half-day every-day and full-day alternate-day, the predominant finding both years was that differences were not large enough to be significant for the total student population. The alternate-day full-day program was consistently better on all tests of language proficiency (six tests) in both years.

The full-day alternate-day model was significantly better than the half-day every-day model for poverty level children. There were no significant differences found when comparing children above poverty level.

The early childhood education program is a powerful program producing large gains in language and in preacademic proficiency for all participating children, both "at risk" children and children above poverty level who were selected as "language models".

Gains made in preschool continue in language development in kindergarten but tend of level off in academic skill areas. By the end of first grade the at risk children who entered the program with serious deficiencies in both language and preacademic skills were performing on the average at above grade level, maintaining normal progress in school with their more advantaged peers.

# PART ONE

## 1984-85 STUDY OF THREE KINDERGARTEN MODELS

### INTRODUCTION

This study is part of a five year process of program review of the early childhood programs of Pasco School District No. 1, initiated in the fall of 1984.

This is a final report on the first year of research. Its purpose was:

> To collect and analyze test data on children participating in the three different types of kindergarten scheduling--half-day every-day; full-day alternate-days; and full-day every-day.
>
> To collect and analyze observational data from every kindergarten classroom to document current use of curriculum materials, time allocations and teching methods -- using a team of observers from the district who will be able to serve as a continuing source of information to planning committees looking at possible curriculum revision.
>
> To collect information from parents on children's previous preschool experiences, their assessment of their children's readiness before starting kindergarten, and their reactions to the three kindergarten scheduling models.
>
> To collect test data from children in the ECE* program in 1984-85, and follow-up test data on former ECE children who were in kindergarten or first grade in 1984-85.

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* ECE="Early Childhood Education", a prekindergarten program.

Most of the findings from this study have been condensed to question and answer format to facilitate presentation of the major findings to the many groups within the district who will be involved in policy and decision making affecting the early childhôod programs. This dissemination has included the District's School Board, Administraters, Teachers, Committee working on Curriculum Revision, and at meetings for parents and interested community members.

This longer report incorporates these graphics which condense project findings, and it includes more of the background information and technical detail for those interested in greater detail or in the technical aspects of the study.

In the second year of the study there will be replication with a smaller sample of the effects of the three scheduling models, using a pre and post test study design and providing for a better balanced distribution of children in the full-day every-day program, than was the case in the first year implementation of this model. It will also include a further replication of the study of the effects of the ECE program and a second follow-up study of children from ECE as they progress through kindergarten and first grade.

## CHARACTERISTICS OF THE PASCO KINDERGARTENS AND PREKINDERGARTEN

Numbers of children Pasco School District has eight elementary schools, with approximately 575 children in kindergarten. During the 1984-85 school year, each of the elementary schools had at least one half-day kindergarten class. Class size was limited to 27 children. There were nine morning classes, and eight afternoon classes.

The full-day, alternate-day kindergartens were implemented at Mark Twain elementary and at Emerson elementary, each of which had two groups of alternate-day classes. One group met on Monday, Wednesday and alternating Fridays. The other group met on Tuesday and Thursday and alternating Fridays. This schedule was continued all year.

Each of the schools offering the full-day alternate-day schedule also offered one class which met half-day every-day during the mornings. Parents at the beginning of the year were given the option of which schedule they preferred and this was honored to the extent of space available. There were more requests for the full-day alternate-day program than could be accommodated. As a result of the demand, the alternate-day classes at Mark Twain operated with an "overload" average attendance of 28 children (at the option of the teacher, who receives extra pay if teaching more than 27 children.)

Families whose children would qualify for free or reduced lunch were somewhat more likely to choose the full-day alternate-day program, resulting in a somewhat higher percentage of "poor" children in this model than was found in the half-day kindergartens.

After the first of the year, late entry pupils were simply assigned to either the half-day or the full-day alternate-day classes on a space available basis.

Children in the full-day every-day program were at Livingston school. This is a school located in a relatively high socioeconomic setting, and nearly all of the children for this program were bussed from another part of the city. Most of the year there were 25 children in this class, which was the only one operating under this schedule.

Children were assigned to this program either because they were of limited English proficiency, or because they were considered to be "high risk" of academic failure because of home conditions or school performance of siblings. Some relatively high performing children were also assigned to the classroom to serve as language models. Even these academically proficient students included a few with behavior problems.

This concentration and relative isolation of children with special needs in one classroom may have influenced the results of the study. It made it impossible to secure an appropriately matched group of children from the other kindergarten models (in terms of proportion who were minority/non-minority and poor/non-poor) to do statistical analysis by these subgroups of children. During the 1985-86 school year, there has been a better balance of children in this classroom. The second year study may produce a more reliable estimate of the potential of this kindergarten model.

The ECE prekindergarten program was offered in Emerson school with two sections, one morning, one afternoon, each serving about 25 children for two and a half hours, with no breakfast or lunch program. A third section known as the East Side Preschool also served 25 children in a morning only program offered in a section of town with a concentration of poor children. The children at the East Side Preschool were served breakfast and lunch. Pasco school district staffed this program with a certified teacher and two aides. The children at Emerson school also had a certified teacher and two aides.

Eligibility for the preschool program was determined by children's classification as "high risk" of school failure, based on poverty or the absence of use of English in the home. All of the children met poverty guidelines at the East Side Preschool. In the Emerson preschools 60% were "high risk" children; and 40% were non-poverty, English speaking children selected to serve as academic and language models. All of the children at the East Side Preschool walked to school from the neighborhood. Children in the Emerson school program were bussed from all parts of the city.

### Teaching staff--number and years of experience.

All of the teachers in the half-day classes had several years of teaching experience at the kindergarten level except one. She was an experienced teacher but had never taught kindergarten before.

One of the two teachers who taught in the alternate-day classes was an experienced kindergarten teacher, and had taught in an alternate-day schedule the year before. The other had only taught one year, and was pregnant and absent for several months during the 1984-85 school year. For both this teacher and her substitute, this was their first year in an alternate-day schedule. They "learned from experience" and by the end of the year had many changes so that overvations in this classroom varied over time. The comparative inexperience and change of teachers could have affected the results of the study.

The one teacher who taught the full-day every-day program was in her first year of teaching. Despite her lack of experience, those observing in her classroom considered her to be a very gifted teacher, and conscientious to the extreme. She felt, however, that her lack of experience plus the newness of the program made the year more difficult for her, and might have influenced the outcome of the study.

Both the teachers in the ECE programs were experienced teachers who had taught at this age level for a number of years.

Approximately one fourth of the students in the kindergarten came from homes in which Spanish was spoken. Only one (of ten) of the half-day teachers was able to speak Spanish. One of the two alternate day teachers could speak Spanish. The teacher of the one class section of full-day every-day kindergarten spoke Spanish. The majority of "target" children served in the ECE program at Emerson were from Spanish speaking homes, and the teacher (and the aides) were both bilingual. At the East Side Preschool about one third of the children were Spanish speaking. The teacher had some Spanish skills, and one of the aides was bilingual.

### Aides and Volunteers and Special Program Staff

The full-day every-day program had a full-time aide, who also spoke Spanish. None of the other kindergartens had a full-time aide in either the half-day or the full-day alternate-day classes. Some had a part-time aide, usually for no more than a few hours a week.

Both of the alternate-day teachers, and all but two of the teachers of half-day kindergarten classes reported that they had "some" parent help. The amount of help varied greatly as is discussed in the later findings. The amount of parent or volunteer help seemed to depend on two things. First, how much time the teacher was willing or able to put into recruitment and training of parent helpers. Second the proximity of the families to the school and the socioeconomic status. A teacher might have many parent helpers during the half day when "walkers" came from the immediate neighborhood, and none during the other half day when the "bus children" were brought in.

Six (of the ten) teachers in half-day programs were using parent help; or other volunteers to teach reading (or to free the teacher to teach reading) for children judged to be beyond the "readiness" stage. Neither of the teachers in help the alternate-day program was teaching reading beyond the prereading skills included in the adopted readiness curriculum, Alpha-Time.

Some children were "pulled out" of all kindergarten classes (except the full-day every-day) for remedial help or bilingual tutoring for time periods ranging from 15 to 45 minutes, from once to several times a week. Observational data on the effects of the pull-out program (what children missed while they were absent) is included in the final section of the report under "other issues". Because both teacher and aide in the full-day every-day program were bilingual, and because having two full-time staff members made it possible to give individual attention and remediation within the classroom, none of the children in this model were "pulled out" for extra services.

### Other characteristics of the kindergarten population.

The figures on the pages which follow show the distribution of minority kindergarten children in the different schools, and compares this distribution between the three kindergarten models. As this shows the distribution is very uneven between different schools ranging from 12% to 56%. The school with only 12% is a rural school and its minority population greatly increases during the "season" with migrant children who are there only a few months. This data was collected in November when the migrant population would have been underestimated at all schools.

Parents are permitted to request morning or afternoon kindergarten sections for their children. The result of this is that parents who are better off and better educated tend to request morning placement for their children, which results in the less popular afternoon sections becoming disproportionately filled with minority and poor children. To some extent this is also affected by bus schedules.

As noted the full-day every-day program and afternoon kindergarten had the highest percentage of minority children.

The number of "poor" children (defined as eligible for free or reduced lunch) also ranged from 12% to 56%. The highest percentages were found in the two full-day models. The percentage in the half-day programs is probably underestimated because the children were not receiving lunch at school. (A few were in breakfast programs operated at some, but not all schools). Since there was no need to determine eligibility when there was no lunch program, teachers had to go by their knowledge of the family to estimate those who would have been eligible.

All children were tested in the Fall on the Comprehensive Test of Basic Skills. The percentage of children who might be considered "high risk", was determined as those whose test scores in math or reading were more than one standard deviation below the mean (i.e. those whose scores were in the lowest 18 percent compared to children in the national norm group). As shown on the figure which follows, the fewest of these children were to be found in the morning half-day kindergarten sections; the most in the afternoon half-day kindergarten or the full-day every-day program. Those in the alternate-day program were in an intermediate position.

Since access to prior preschool experience was thought to be a characteristic that might affect the study, parents were asked if their children had attended a preschool program, if it had an educational component, and whether they felt it had helped their child's readiness for school. As shown on the figure which follows, the percentage of children with preschool experience was almost exactly the same (in each case about two-thirds of all children) for the three kindergarten models, with little difference between afternoon and morning half-day sections. The majority had attended for more than half day, and parents overwhelmingly felt that it had helped their child's kindergarten readiness.

## SELECTION OF A KINDERGARTEN STUDY SAMPLE

In order to make the end of year achievement levels of children meaningful, it is necessary to determine that they were approximately equal to begin with. Pretests had been given in the fall to children in the full-day every-day program (as part of the planned bilingual program evaluation.) When it was decided to take on the larger study, comparing all three kindergarten models, it was too late to administer these same pretests to a sample of children from the other models. It was decided, therefore, to use the fall test scores on the CTBS to draw out a stratified sample of children from different ability groupings.

A drawback to this plan was that kindergarten teachers were convinced that kindergarten children who took a standardized test in the fall were really not testable, and that the results on the CTBS were not to be believed.

To determine whether these test scores could be used, the evaluator asked all teachers for the first quarter report cards for their children. The Pasco kindergarten report card is quite specific as to different skills (i.e. teachers are asked to show children all the capital letters arranged in non alphabetical order and see how many the child can name; same with small letters and numerals. Children are asked to count quantities, do rote counting, tell initial consonant sounds, make rhyming words, etc.) The report card data would presumably be representative of the child's "true" ability as each teacher collected it individually. This report card data was put on computer along with the CTBS math and reading scores, and a correlational analysis was done. This showed a high correlation between the CTBS scores and corresponding reading or math skills as evaluated by teachers on the report cards. From this it was determined that there was sufficient validity in the CTBS fall scores to use these as the basis for selecting a sample of children proportionately equal as to initial ability level between the three kindergarten samples.

The final sample included 183 children. Of these 127 were from half day kindergartens, including both morning and afternoon sections and from all schools. Another 38 were from alternate-day programs representing both schools and both sections within each school. Eighteen were included from the full-day every-day program. Because this class had the smallest number of children, it was used as the base group to determine what proportion of children would be selected from the ability groups within the other two models. There were four ability groups used: low (more than one standard deviation below the mean), low-average (up to one standard deviation below the mean), high-average (up to one standard deviation above the mean),and high (more than one standard deviation above the mean.) The reduction to the number needed within each ability grouping was made randomly, except for a few substitutions made to equalize as much as possible the proportion of poor/non-poor and minority/non-minority children between the half-day every-day and the full-day alternate-day programs.

After the final sample was selected, the CTBS fall scores in math and reading were compared statistically using analysis of variance. This confirmed that there were no significant differences on these fall test scores between the three models in the final sample. It was possible, therefore, to equate the models as to approximate ability level of children starting in kindergarten for all three models. It was not possible to equate them on numbers of non-minority or non-poor children since the full-day every-day program only had three children in these categories--an insufficient group to justify statistical analysis.

## SELECTION OF TEST INSTRUMENTS

Two standardized tests were used: The Peabody Picture Vocabulary Test (Dunn, 1965) and the Wide Range Achievement Test (Jastak, 1978). Both are widely used in educational evaluation. Both have norms standardized to a mean of 100 and a standard deviation of 15. Since all tests had to be individually administered, these tests were useful in that the administration time is relatively low, and they can be administered by trained paraprofessionals. The WRAT provided a subtest of reading and math and handwriting (at this level the "spelling" subtest is essentially a test of handwriting skills since it involves copying 18 marks of graduated level of difficulty and printing two letters of a name.) The Peabody test provided a measure of language to add to these preacademic skills.

The other ten subtests used were from the KESA, a locally developed test of skills taught in Pasco kindergartens. Since this correlated particularly well to the curriculum, it was felt these tests made a useful addition to the total test battery. Five of the ten tests on the KESA were language measures, two receptive (like the Peabody Picture Vocabulary Test) and three expressive. Having this array of language tests was a useful dimension to the study since one of the conditions motivating the study was to determine which program might best serve the growing population of children in Pasco schools who have a limited English proficiency.

One of the ten KESA tests (one calling for recognition of shapes) was eliminated from the comparative study because it was found that the test called for identification of an "ellipse" and several teachers had taught this shape as an "oval" resulting in nonrandom "errors" on the test which we felt invalidated the results.

### Method of Data Analysis

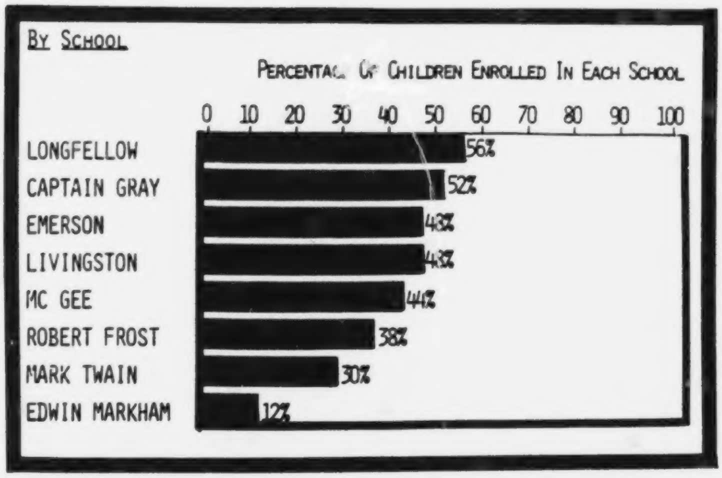
All test data was computerized at Washington State University. Analysis used the SPSS package of statistical procedures; (Nye, and others, 1970 and 1983). Comparisons for statistical significance between two groups used T-tests; for three groups, analysis of variance or ANOVA. When the probability of chance occurence was less than .05 it was considered to be statistically significant. Findings of this analysis are shown on the pages which follow and in the tables in the Appendix.

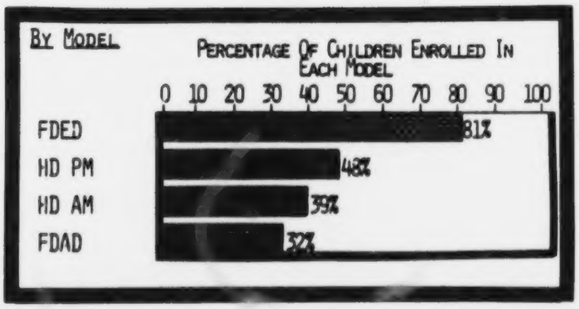
## HOW COMPARABLE WERE THE THREE KINDERGARTEN MODELS IN ENROLLMENT OF NON-WHITE STUDENTS?

FINDINGS: DEMOGRAPHIC DATA WAS COLLECTED DURING NOV., 1984 AND IS SHOWN BY SCHOOL AND BY PROGRAM MODEL IN THE FIGURES BELOW. MINORITY ENROLLMENT IN PASCO SCHOOLS AS A WHOLE WAS 19% IN 1973, AND HAD INCREASED TO 34% A DECADE LATER IN 1983. THE 29% KINDERGARTEN ENROLLMENT IS LESS THAN THIS AVERAGE, PROBABLY BECAUSE PASCO HAS A LARGE SEASONAL HISPANIC ENROLLMENT IN THE SPRING AND EARLY FALL WHICH WAS NOT PRESENT IN NOVEMBER WHEN THIS DATA WAS GATHERED.

NON-WHITE ENROLLMENT

29% OF THE KINDERGARTEN ENROLLMENT IN THE PASCO SCHOOL DISTRICT





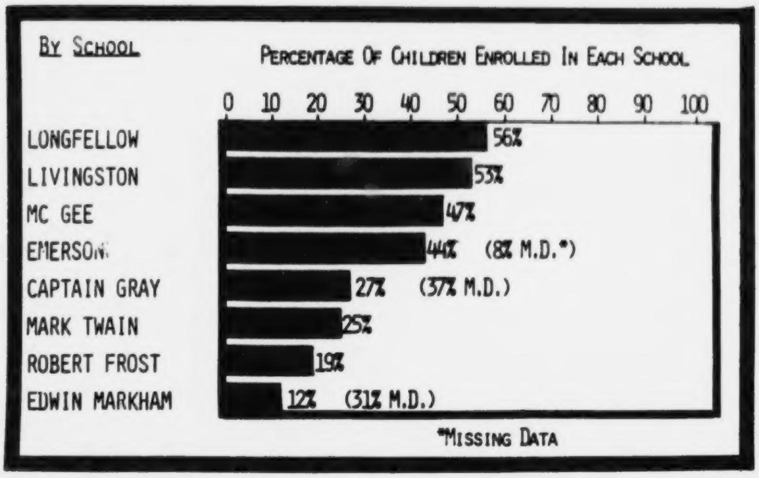
CONCLUSION: THE FULL-DAY EVERY-DAY KINDERGARTEN PROGRAM HAD NEARLY TWICE THE ENROLLMENT OF NON-WHITE CHILDREN AS THAT FOUND IN EITHER HALF-DAY OR FULL-DAY ALTERNATE DAY CLASSES.

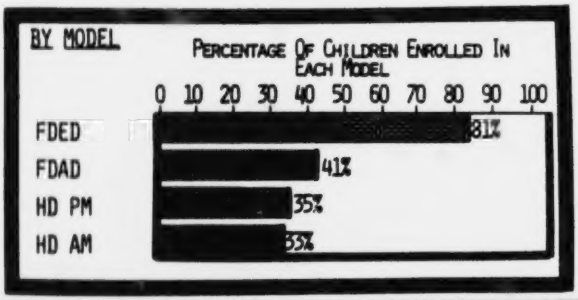
## HOW COMPARABLE WERE THE THREE PROGRAM MODELS IN ENROLLMENT OF POOR CHILDREN?

FINDINGS: "POOR" WAS DEFINED AS CHILDREN ELIGIBLE FOR FREE OR REDUCED LUNCH. THE 38% TOTAL SHOWN IN THE FIGURES BELOW IS ALMOST CERTAINLY AN UNDERESTIMATE, BECAUSE OF MISSING DATA. CAPTAIN GRAY (37% MISSING DATA) IS A SCHOOL IN WHICH ABOUT 75% OF THE CHILDREN QUALIFY FOR FREE OR REDUCED LUNCH. BECAUSE HALF-DAY KINDERGARTEN CHILDREN DO NOT STAY FOR LUNCH, THIS DATA WAS BASED ON ELIGIBILITY OF OLDER SIBLINGS OR SOMEONE'S KNOWLEDGE OF FAMILY CIRCUMSTANCES.

CHILDREN ELIGIBLE FOR FREE OR REDUCED LUNCH

(38% Of The Kindergarten Enrollment In The Pasco School District)

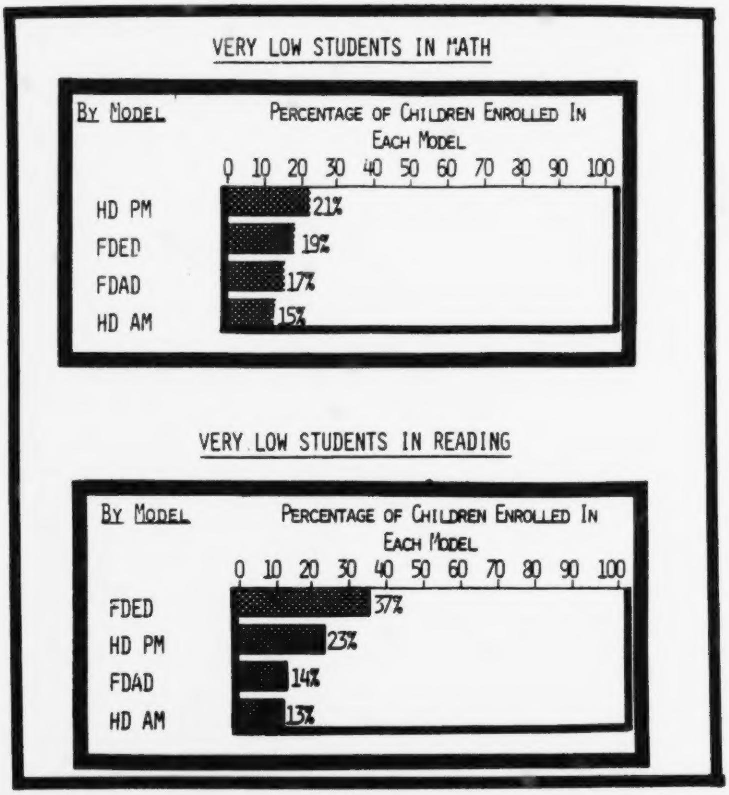




CONCLUSION: THE PERCENTAGE OF POOR CHILDREN IN THE FULL-DAY EVERY-DAY MODEL IS ABOUT TWICE THAT OF EITHER HALF-DAY OR FULL-DAY ALTERNATE-DAY CLASSES.

### HOW COMPARABLE WERE THE MODELS IN THE ENROLLMENT OF CHILDREN "HIGH RISK" OF ACADEMIC FAILURE BECAUSE OF LOW SCORES IN ACADEMIC SKILLS AREAS?

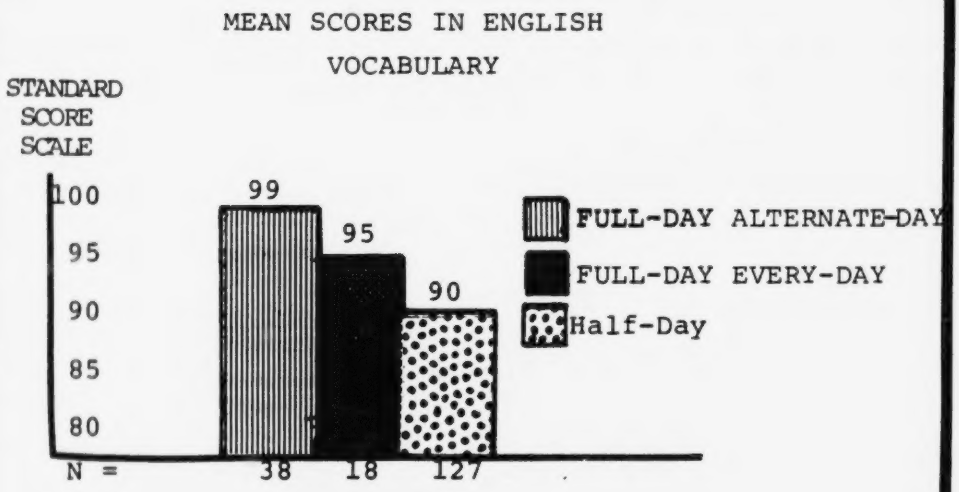
FINDINGS: THE TWO FIGURES BELOW SHOW THE PERCENTAGE OF VERY LOW CHILDREN IN MATH AND READING, BY MODEL. VERY LOW WAS DEFINED AS MORE THAN ONE STANDARD DEVIATION BELOW THE MEAN BY NATIONAL NORMS FOR THE COMPREHENSIVE TEST OF BASIC SKILLS GIVEN TO ALL CHILDREN IN THE FALL OF 1984.



**CONCLUSION:** AMONG THE TOTAL STUDENTS ENROLLED IN EACH MODEL, THE PERCENTAGE OF CHILDREN VERY LOW IN READING WAS TWICE AS HIGH FOR CHILDREN IN THE FULL-DAY EVERY-DAY PROGRAM AS IN TWO OF THE OTHER MODELS. TO EQUALIZE THE THREE MODELS, A SAMPLE WAS DRAWN FROM EACH IN WHICH THE PROPORTIONS WERE THE SAME FOR CHILDREN WHOSE FALL CTBS SCORES WERE VERY LOW, LOW AVERAGE, HIGH AVERAGE, AND VERY HIGH. STATISTICAL ANALYSIS CONFIRMED THAT THE SAMPLE SELECTED OF 133 CHILDREN SHOWED NO SIGNIFICANT DIFFERENCES IN INITIAL LEVEL OF READING OR MATH SCORES.

## OVERALL, WERE THERE SIGNIFICANT DIFFERENCES IN ACADEMIC ACHIEVEMENT OF CHILDREN IN THE THREE MODELS?

FINDINGS: Children were compared on 13 test measures. There were no differences large enough to be statistically significant between the three models on 12 of these 13 tests. The one test on which the differences were statistically significant was in English Vocabulary, favoring the full-day models as shown in the figure below.



p < .04 Differences are statistically significant at .04 level, i.e., the probability of this much difference occurring by chance is less than 4 in 100.

## CONCLUSION:

THERE APPEARED TO BE NO REAL DIFFERENCE BETWEEN CHILDREN'S ACADEMIC PERFORMANCE IN THE THREE PROGRAM MODELS ON MOST TESTS - 12 OUT OF 13.

THE ONE TEST WHICH SHOWED SIGNIFICANT DIFFERENCES FAVORED THE ALL-DAY MODELS; ALTERNATE-DAY AND ALL-DAY EVERY-DAY BOTH SCORED HIGHER THAN CHILDREN IN THE HALF-DAY PROGRAM.

## WHICH MODELS WERE MOST EFFECTIVE FOR LANGUAGE DEVELOPMENT?

FINDINGS: SIX OF THE 13 TESTS RELATED TO RECEPTIVE OR EXPRESSIVE LANGUAGE SKILLS. THE FIGURE BELOW SHOWS THE AVERAGE SCORE OF THE THREE MODELS IN RANK ORDER FROM HIGHEST TO LOWEST ON EACH OF THESE SIX TESTS.

| RANK ORDER | MEAN STAND. SCORE | MEAN RAW SCORE | | | | |
|---|---|---|---|---|---|---|
| | ENGLISH VOCABULARY (Receptive)* | SPATIAL VERBAL* (Expressive) | FOLLOWING DIRECTIONS* (Receptive) | SPATIAL MOTORIC* (Receptive) | ANSWERING QUESTIONS (Expressive) | DOING ANALOGIES (Expressive) |
| 1 | [a]FDAD 98.9 | FDED 8.1 | FDED 7.8 | FDAD 9.6 | FDAD 9.5 | FDAD 13.3 |
| 2 | [b]FDED 94.7 | FDAD 7.9 | FDAD 7.7 | HD 9.4 | FDED 9.3 | FDED 13.1 |
| 3 | [c]HD 90.4 | HD 7.8 | HD 7.4 | FDED 9.3 | HD 9.0 | HD 12.9 |
| *Probability that differences could occur by chance.* | <.04 | <.91 | <.53 | <.54 | <.17 | <.61 |

[a]FDAD = Full-Day Alternate-Day; [b]FDED = Full-Day Every-Day; [c]HD = Half-Day

**SPATIAL VERBAL = Telling where an object is, i.e., over, under, beside, etc.*

**FOLLOWING DIRECTIONS = Remembering a series of instructions and pointing to objects in order.*

**SPATIAL MOTORIC = Placing an object over, under, in corner, etc.*

CONCLUSIONS: CHILDREN IN THE ALL-DAY MODELS APPEARED TO CONSISTENTLY SCORE HIGHER THAN THE HALF-DAY CHILDREN ON ALL MEASURES OF EXPRESSIVE AND RECEPTIVE LANGUAGE. HOWEVER, THE DIFFERENCES IN SCORES WERE STATISTICALLY SIGNIFICANT ON ONLY ONE OF THE SIX TESTS.

## WHICH MODELS WERE MOST EFFECTIVE FOR PRE-READING SKILLS?

FINDINGS: TWO TESTS OF THE 13 TESTS MEASURED PRE-READING OR READING SKILLS. THE AVERAGE SCORES ON THESE TWO TESTS ARE SHOWN IN THE FIGURE BELOW.

| RANK ORDER | WIDE RANGE ACHIEVEMENT TEST - READING Mean Standard Score | NAMING LETTERS Mean Raw Score |
|---|---|---|
| 1 | [a]HD 99.2 | FDED 34.3 |
| 2 | [b]FDAD 98.3 | HD 28.9 |
| 3 | [c]FDED 98.2 | FDAD 26.9 |
| *Probability differences could occur by chance* | $<0.91$ | $<0.22$ |

*[a]HD = Half-Day; FDAD = Full-Day Alternate Day; FDED = Full-Day Every-Day*

CONCLUSION: THE THREE GROUPS HAD VIRTUALLY IDENTICAL SCORES ON THE STANDARDIZED TEST IN READING. SINCE A STANDARD SCORE OF 100 REPRESENTS THE NATIONAL NORM, ALL THREE GROUPS WERE NEARLY AT THIS LEVEL.

CHILDREN IN THE FULL-DAY EVERY-DAY PROGRAM WERE QUICKER AND ABLE TO IDENTIFY MORE LETTERS THAN CHILDREN IN THE HALF-DAY OR THE FULL-DAY ALTERNATE-DAY PROGRAMS.

## WHICH MODELS WERE MOST EFFECTIVE FOR ACADEMIC SKILLS, OTHER THAN READING OR LANGUAGE?

FINDINGS: THE FIGURE BELOW SHOWS THE COMPARATIVE SCORES FOR CHILDREN IN MATH, HANDWRITING, AND COLOR RECOGNITION.

| RANK ORDER | WIDE RANGE ACHIEVEMENT TEST PRE-MATH STANDARD SCORES | NUMBER RECOGNITION | TELLING QUANTITIES |
|---|---|---|---|
| 1 | [a]FDAD 98.6 | HD 40.6 | HD 9.3 |
| 2 | [b]HD 98.4 | FDAD 39.6 | FDED 9.1 |
| 3 | [c]FDED 95.1 | FDED 37.9 | FDAD 8.9 |
| Prob. diff. could occur by chance | <.49 | <.79 | <.35 |

| RANK ORDER | WIDE RANGE ACHIEVEMENT TEST HANDWRITING STANDARD SCORES | NAMING COLORS | |
|---|---|---|---|
| 1 | FDAD 95.2 | FDAD & HD 21.9 | |
| 2 | HD 94.0 | | |
| 3 | FDED 88.7 | FDED 20.9 | |
| Prob. diff. could occur by chance | <.20 | <.76 | |

[a]*Full-Day Alternate Day;* [b]*Half-Day;* [c]*Full-Day Every-Day*

**CONCLUSION:** CHILDREN IN THE HALF-DAY AND FULL-DAY ALTERNATE-DAY MODELS GENERALLY EXCEEDED CHILDREN IN THE ALL-DAY EVERY-DAY MODEL IN TESTS RELATED TO MATH, HANDWRITING, OR NAMING OF COLORS. HOWEVER, NONE OF THE DIFFERENCES BETWEEN MODELS ON THESE FIVE TESTS WERE STATISTICALLY SIGNIFICANT.

## IS THE FULL-DAY ALTERNATE-DAY OR HALF-DAY MODEL MORE EFFECTIVE FOR POOR CHILDREN?

FINDINGS: IN THE FINAL SAMPLE, THE NUMBER AND PERCENTAGE OF CHILDREN WHO WERE POOR (E.G., ELIGIBLE FOR FREE OR REDUCED LUNCH) AND NON-POOR WAS AS FOLLOWS:

| | | | |
|---|---|---|---|
| HD | Non-Poor 69 (54%) | Poor 54 (43%) | Missing Data 4 (3%) |
| FDAD | Non-Poor 20 (53%) | Poor 18 (47%) | |
| *FDED | Non-Poor 3 (17%) | Poor 15 (83%) | |

**Because a subgroup of 3 is not sufficient for statistical analysis,thefollowing figure compares only the half-day and full-day alternate-day programs.*

| | Non-Poor | | | Poor | | |
|---|---|---|---|---|---|---|
| | HD | FDAD | Prob.* | HD | FDAD | Prob.* |
| **LANGUAGE** | | | | | | |
| English Vocabulary | 94.0 | 101.7 | <.11 | 85.6 | 95.7* | <.04 |
| Spatial Verbal | 7.5 | 8.0 | <.25 | 7.6 | 8.2 | <.22 |
| Spatial Motoric | 9.4 | 9.7 | <.31 | 9.2 | 9.4 | <.50 |
| Following Directions | 7.9 | 8.0 | <.83 | 6.8 | 7.4 | <.29 |
| Answering Questions | 9.3 | 9.7 | <.16 | 8.7 | 9.2 | <.20 |
| Analogies | 13.3 | 13.5 | <.63 | 12.3 | 13.0 | <.33 |
| **READING** | | | | | | |
| WRAT Reading | 101.5 | 101.1 | <.90 | 95.3 | 96.5 | <.71 |
| Naming Letters | 32.3 | 30.1 | <.53 | 24.1 | 23.4 | <.86 |
| **MATH AND OTHER** | | | | | | |
| WRAT Math | 99.8 | 101.1 | <.67 | 96.6 | 95.8 | <.79 |
| Naming Numbers | 43.1 | 41.9 | <.75 | 36.7 | 36.9 | <.95 |
| Quantities | 9.4* | 8.5 | <.01 | 9.1 | 9.4 | <.42 |
| WRAT Handwriting | 95.0 | 97.3 | <.48 | 93.5 | 92.9 | <.88 |
| Naming Colors | 22.7 | 22.4 | <.78 | 20.8 | 21.4 | <.70 |

**Prob. refers to the probability that this much difference would occur by chance. A probability of less than .05 is considered statistically significant.*

CONCLUSION: POOR CHILDREN APPEARED TO DO BETTER IN THE FULL-DAY ALTERNATE-DAY PROGRAM, HAVING HIGHER SCORES IN ALL SIX LANGUAGE TESTS, AND IN FOUR OF SEVEN TESTS IN OTHER ACADEMIC AREAS. HOWEVER, IN ONLY ONE OF THESE TESTS WAS THE SUPERIORITY ENOUGH TO BE STATISTICALLY SIGNIFICANT.

CHILDREN WERE ARE NOT POOR ALSO SEEMED TO DO BETTER IN LANGUAGE DEVELOPMENT IN THE FULL-DAY ALTERNATE-DAY PROGRAM, WITH HIGHER SCORES ON SIX OUT OF SIX TESTS. IN OTHER ACADEMIC AREAS, CHILDREN IN THE HALF-DAY CLASSES HAD HIGHER MEAN TEST SCORES IN FIVE OUT OF SEVEN TESTS, IN ONLY ONE OF WHICH THE SUPERIORITY WAS ENOUGH TO BE STATISTICALLY SIGNIFICANT --THE SUBTEST ON NAMING QUANTITIES.

## WAS THE FULL-DAY ALTERNATE-DAY OR THE HALF-DAY SCHEDULE MORE EFFECTIVE FOR MINORITY (NON-WHITE) CHILDREN?

FINDINGS: IN THE FINAL SAMPLE, THE NUMBER AND PERCENTAGE OF CHILDREN WHO WERE WHITE AND NON-WHITE IS SHOWN BELOW:

| | | | | |
|---|---|---|---|---|
| HD | White | 45 (35%) | Non-White | 82 (65%) |
| FDAD | White | 18 (47%) | Non-White | 20 (53%) |
| *FDED | White | 3 (17%) | Non-White | 15 (83%) |

**Because a subgroup of 3 is not sufficient for statistical analysis, the figures below compare only the full-day alternate-day and half-day models.*

| | White | | | Non-White | | |
|---|---|---|---|---|---|---|
| | HD | FDAD | Prob.* | HD | FDAD | Prob.* |
| **LANGUAGE** | | | | | | |
| English Vocabulary | 101.8 | 104.4 | <.43 | 84.2 | 93.9* | <.05 |
| Spatial Verbal | 8.8* | 8.0 | <.02 | 7.4 | 7.7 | <.49 |
| Spatial Motoric | 9.8 | 9.8 | <.90 | 9.1 | 9.4 | <.44 |
| Following Directions | 8.2 | 8.2 | <.92 | 7.0 | 7.2 | <.66 |
| Answering Questions | 9.8 | 9.7 | <.36 | 8.7 | 9.3 | <.06 |
| Analogies | 14.4 | 14.1 | <.59 | 12.0 | 12.5 | <.41 |
| **READING** | | | | | | |
| WRAT Reading | 105.1 | 104.0 | <.72 | 96.0 | 93.3 | <.40 |
| Letter Naming | 35.2 | 34.2 | <.77 | 25.4 | 20.4 | <.18 |
| **OTHER ACADEMIC** | | | | | | |
| WRAT Math | 102.8 | 105.6 | <.29 | 96.0 | 92.3 | <.18 |
| Naming Numerals | 43.4 | 50.0 | <.08 | 39.0* | 30.2 | <.03 |
| Telling Quantities | 9.1 | 9.4 | <.52 | 9.3* | 8.5 | <.01 |
| WRAT Handwriting | 97.2 | 99.4 | <.52 | 92.3 | 91.5 | <.79 |
| Naming Colors | 23.4 | 23.1 | <.83 | 21.1 | 20.9 | <.84 |

**Prob. refers to the probability that this much difference would occur by chance. A probability of less than .05 is considered statistically significant.*

CONCLUSION: FOR NON-WHITE CHILDREN THE FULL-DAY ALTERNATE-DAY MODEL SEEMED TO BE CONSISTENTLY STRONGER IN ALL TESTS RELATED TO LANGUAGE. THE DIFFERENCE WAS STATISTICALLY SIGNIFICANT FOR ONLY ONE TEST: ENGLISH VOCABULARY.

FOR NON-WHITE CHILDREN, THE HALF-DAY MODEL SEEMED TO BE CONSISTENTLY MORE EFFECTIVE FOR READING, MATH AND OTHER ACADEMIC SKILLS. IN TWO OF THE SUBTESTS IN MATH, THE DIFFERENCE WAS LARGE ENOUGH TO BE STATISTICALLY SIGNIFICANT.

FOR WHITE CHILDREN, THE HALF-DAY MODEL APPEARED TO BE MORE EFFECTIVE IN LANGUAGE, READING, AND NAMING COLORS: HOWEVER, THE DIFFERENCE WAS STATISTICALLY SIGNIFICANT ON ONLY ONE TEST: SPATIAL VERBAL.

THE ALL-DAY ALTERNATE-DAY PROGRAM PRODUCED HIGHER SCORES FOR WHITE CHILDREN IN MATH AND HANDWRITING. NONE, HOWEVER, WERE STATISTICALLY SIGNIFICANT.

## HOW MUCH GAIN WAS MADE BY CHILDREN IN THE FULL-DAY EVERY-DAY KINDERGARTEN PROGRAM ON STANDARDIZED TESTS?

FINDINGS: CHILDREN IN THE FULL-DAY EVERY-DAY PROGRAM (UNLIKE CHILDREN IN THE OTHER KINDERGARTEN MODELS) WERE PRETESTED AT THE BEGINNING OF THE KINDERGARTEN YEAR, AND POST TESTED WITH THE SAME BATTERY IN THE FALL. THE FIGURE BELOW SHOWS GAINS ON THE FOUR STANDARDIZED TESTS FOR ALL CHILDREN WITH VALID PRE AND POST TESTS.

| NUMBER | TEST | PRE TEST MEAN STANDARD SCORE | POST TEST MEAN STANDARD SCORE | GAIN | STATISTICALLY SIGNIFICANT? |
|---|---|---|---|---|---|
| 22 | PPVT English Vocabulary | 80.5 | 92.7 | 12.2 | Yes |
| 22 | WRAT English Reading | 90.0 | 98.8 | 8.8 | Yes |
| 22 | WRAT Math Skills | 86.8 | 95.3 | 8.5 | Yes |
| 22 | WRAT Handwriting | 84.4 | 90.2 | 5.8 | Yes |

CONCLUSION: CHILDREN IN THE FULL-DAY EVERY-DAY PROGRAM MADE VERY LARGE GAINS ON ALL FOUR TESTS. ON THESE TESTS THE "NORMAL RANGE" IS BETWEEN 90 AND 110. THE GAINS BROUGHT THE CLASS AVERAGE SCORES WITHIN THIS NORMAL RANGE ON ALL FOUR TESTS. THE U.S. DEPT. OF EDUCATION CONSIDERS A GAIN IN STANDARD SCORE OF FIVE POINTS OR MORE "EDUCATIONALLY SIGNIFICANT". THIS CLASS EXCEEDED THIS STANDARD ON ALL FOUR TESTS. THE GAINS IN ENGLISH VOCABULARY ARE OVER TWICE THIS STANDARD.

## HOW MUCH GAIN WAS MADE BY CHILDREN IN THE FULL-DAY EVERY-DAY KINDERGARTEN PROGRAM ON DISTRICT CURRICULUM TESTS?

FINDINGS: THE CHILDREN IN THE FULL-DAY EVERY-DAY KINDERGARTEN WERE PRE AND POST TESTED ON TEN SUBTESTS KEYED TO THE DISTRICT CURRICULUM. THEIR GAINS ON THESE LOCAL TESTS ARE SHOWN BELOW.

| NUMBER | TEST | PRE TEST MEAN RAW SCORE | POST TEST MEAN RAW SCORE | GAIN | STATISTICALLY SIGNIFICANT? |
|---|---|---|---|---|---|
| 22 | Letter Naming | 5.6 | 33.5 | 27.9 | Yes |
| 22 | Numeral Naming | 17.5 | 37.9 | 20.4 | Yes |
| 22 | Color Naming | 12.2 | 20.7 | 8.5 | Yes |
| 22 | Analogies | 10.0 | 13.0 | 3.0 | Yes |
| 22 | Quantities | 6.2 | 9.2 | 3.0 | Yes |
| 22 | Shapes Naming | 6.5 | 10.8 | 4.3 | Yes |
| 22 | Spatial Verbal | 6.4 | 8.0 | 1.6 | Yes |
| 22 | Spatial Motoric | 8.1 | 9.0 | 0.9 | Yes |
| 22 | Answering Questions | 8.4 | 9.1 | 0.7 | No |
| 22 | Following Directions | 7.7 | 7.9 | 0.2 | No |

CONCLUSION: CHILDREN SHOWED SIGNIFICANT GAINS IN EIGHT OF THE 10 CURRICULUM AREAS TESTED. BECAUSE CHILDREN IN THE OTHER KINDERGARTEN MODELS WERE NOT PRE AND POST TESTED, IT IS NOT POSSIBLE TO JUDGE HOW THIS GAIN COMPARES TO THAT OF CHILDREN ATTENDING A HALF-TIME MODEL.

## THE CLASSROOM OBSERVATION DATA

In additional to examining test data, the study of kindergartens included collecting classroom observational data from all classes in the district. The research director observed each teacher for one full session (full-day or half-day) and developed a structured observation instrument to be used by other observers so that the same types of information would be collected relative to each program.

Additional observations were then done of every teacher by one or more persons from an observation "team" made up of seven administrators (the curriculum director, three directors of special programs and three principals), three parents and four kindergarten teachers. Of the teachers one was teaching in the alternate-day program and the other three were teaching half-day classes.

Each person on the observation team observed at least one full-day session and one or more half-day classes, if possible including a morning and an afternoon class session. This enabled the observers to make comparisons of the two tuypes of programs based on actual observed behavior, and it provided two or more observations for each teacher. (There was one exception: a teacher who had only one observation, by the research director, since the second observer assigned to that teacher was unexpectedly called away in the middle of an observation and was unable to make it up at another time.)

The observation format recorded both the "planned" and the actual use of time on the day observed. This was done not to see how closely teachers adhered to a planned schedule since it was recognized there are interruptions, special programs and many other good reasons for departing from a planned schedule. The purpose was to record use of time using a common set of definitions for various types of activities. This was difficult using only the teacher's "planned" schedule since many would ambiguously list a time block simply as "unit time" or "centers" which didn't provide much of a clue as to the academic content of the instruction. Using the combined information of the teachers and one or more classroom observers, it was possible to make an estimate of time usage in various subject areas by teacher and by program model.

In addition to recording observational data on the time usage in the classroom by subject area, the observations recorded whether the attention focus was the teacher or the students; whether children were in a total group, in small groups or working individually; whether the children were free to talk and move around. It recorded transition time as well as academic learning time. And it noted whether the teacher was checking children's understanding individually, or by selecting students at random, or not at all.

One purpose of this observational data was to determine whether the content of instruction was sufficiently comparable in the three models to make it reasonable that differences in child achievement was, in fact, related to differences in schedule rather than to some difference in teaching methods or curriculum. Another purpose was to provide baseline information for the committees working on setting policy and recommending changes in the curriculum.

The third purpose was to obtain objective information on some of the concerns teachers and parents had expressed about the possible advantages or defects in the three kindergarten schedules. Each observer had a minimum of two observations because they had to observe at least one all-day classroom and one or more of the half-day classrooms. After observing in some combination of classrooms, the observers were asked to answer several comparative questions, based on actual observed behavior in the classrooms they had visited. These questions had to do with "issues" raised pro and con the different scheduling models as taken from "position papers" which had been published and from visits with proponents of each of the various schedules. The purpose was to see if these objections, or claims, were valid based on observational evidence.

One issue had to do with fatigue and the productivity of learning time in the afternoon part of an all day session. Those favoring half day programs felt this was best for the five year old child because they could stay alert and attentive for half a day, but could not be expected to do so for a whole day. They also felt children would learn more in two half day sessions than in one whole day because the learning time in the later half of a whole day session would be wasted because the child would not be fresh to concentrate on new learning.

Those favoring alternate day countered that children quickly adjusted to a full day and after the first few weeks in the fall did not become overly tired in an all day session. They contended that as long as the daily schedule properly alternated quiet times with active times, and changed activities frequently enough to hold children's attention, fatigue would not be a problem.

The observers confirmed the position of those favoring a full-day program. None found evidence of fatigue affecting the learning in the full-day session more so than in a half-day classroom. There was, in fact, some more fatigue in evidence in half-day afternoon classes than in the whole-day programs. This may be because teachers can control the pacing of activities in a whole day program so that children do not wear themselves out. They cannot control what the child does in the other half of a school day when the child is not in school. Observers also felt that there was no difference between the classrooms they observed in terms of effectiveness of instruction, morning or afternoon. In general they found effective learning going on all day in either setting.

Another issue had to do with the time in school provided by the half-day or the full-day alternate-day programs. Those favoring alternate-day programs felt they would have more effective learning time because they would cut in half the "transition" time involved in getting children settled for the day, or picking up their things getting ready to go home. They would also cut down on repetitive morning activities, and they would have more total time to spend with children because of elimination of the noon bussing. Those favoring half days contended that the morning opening activities were valuable parts of the teaching day and not in any sense wasted learning time. They felt that whatever transition time was gained at the beginning and close of a half day session, would be lost in the transition time around lunch time and in the time necessary for children to take an afternoon nap.

The observers confirmed the value of the morning opening activities, and the fact that the transition time of getting ready for lunch and coming back to afternoon activities was the equivalent of whatever transition time was gained from not having the transition at the beginning and closing of a daily half day session. The total amount of transition time within each of the three schedules seemed to depend on teacher classroom management skills rather than being an intrinsic advantage to one or the other schedule.

However the observations also confirmed that the alternate-day schedule did provide a substantially longer period of time in school, ranging from two to four hours every week added "school time" for children on the alternate-day schedule. Comparison of the part of the day used for "academic learning" showed that the half-day and the alternate-day classes both showed about the same range of time, depending on how the teacher used the time for academic or nonacademic purposes. Since even nonacademic time at school provides opportunities for child conversation and interaction with other children, this additional time in school may be of benefit, particularly for children who may not hear much English at home.

Another issue was general atmosphere of the classroom. The alternate-day teachers felt the full-day allowed them to pace their activities differently and the result was a more relaxed learning atmosphere. The observations did not confirm this. Whether the atmosphere of the classroom was relaxed or not seemed to depend more on teacher style than on scheduling, they concluded.

There was much concern about the effects of discontinuity in the alternate-day schedule. One of these was whether children would be able to learn concepts that involved sequence — such as today, yesterday, tomorrow, etc. The observers found that children in either alternate-day or half-day schedules learned concepts of sequence with no apparent difficulty. Both classes used a calendar sort of opening activities that dealt with today, yesterday, tomorrow and it presented no more problems in one classroom than in another. Similarly both types of classrooms had activities involving sequence--growing of flowers from seeds or bulbs, hatching eggs, art projects that must be done in sequence. None seemed to present any difficulties in either classroom that the observers could detect.

Another issue was whether the alternate day schedule would make it more difficult to involve parents in helping their children at home. Some half-day teachers felt that their practice of sending home information at the beginning of the week to be worked on and brought back later in the week would be impossible in alternate-day scheduling where one group of children would only meet on two days in a given week. The observers found that the use of communications to the home encouraging parents to help with child activities was more or less equivalent in all the models, as was the practice of children bringing in objects for "show and tell" and to represent the "letter person sound" for that week, etc. The extent of involvement of parents seemed to depend on how much effort the teacher was willing to put into creation of games and other learning activities that parents could use with children, and the time to communicate with parents to encourage such activities. This had little or nothing to do with the children's schedules.

In addition to the classroom observations, a survey form was sent to parents to ask their view on the advantages and disadvantages they had found in their child's schedule, and their choice of schedules should they have another child entering kindergarten.

Some of the observational and parent survey responses are shown on the pages which follow.

## HOW MUCH DIFFERENCE WAS THERE BETWEEN KINDERGARTEN CLASSES IN TIME SPENT IN READING AND LANGUAGE ARTS?

FINDINGS: THE TABLE BELOW SHOWS THE RANGE OF TIME SPENT IN READING AND LANGUAGE ARTS ACTIVITIES, FROM LEAST TO MOST, WITHIN EACH KINDERGARTEN MODEL.

RANGE OF TIME IN LANGUAGE ARTS AND READING ACTIVITIES

TIME IN TWO WEEK PERIOD

| MODEL | LEAST | MOST |
|---|---|---|
| HD | 220 min. | 720 min. |
| FDAD | 460 min. | 660 min. |
| FDED | | 1380 min. |

Note: Reading instruction included phonics (letter and sound recognition) in all classes. Six of 10 half day teachers, and the full-day every day teachers, also had some children doing reading from books toward the end of the kindergarten year. The alternate day teachers did not teach "book" reading.

CONCLUSION:

IN THIS SUBJECT AREA, THERE WAS SO MUCH DIVERSITY IN TIME SPENT WITHIN KINDERGARTEN MODELS THAT THERE APPEARED TO BE NO SYSTEMATIC DIFFERENCE BETWEEN MODELS FOR THE HALF-DAY AND FULL-DAY ALTERNATE-DAY PROGRAMS. THE EXTRA TIME PROVIDED BY THE FULL-DAY EVERY DAY MODEL WAS USED PRIMARILY FOR MORE LANGUAGE ARTS ACTIVITIES.

HOW MUCH DIFFERENCE WAS THERE BETWEEN KINDERGARTEN CLASSES IN TIME SPENT ON MATH SKILLS?

FINDINGS: THE TABLE BELOW SHOWS THE RANGE OF TIME SPENT ON MATH SKILLS, FROM LEAST TO MOST, WITHIN EACH KINDERGARTEN MODEL.

RANGE OF TIME SPENT ON MATH SKILLS

TIME IN TWO WEEK PERIOD

| MODEL | LEAST | MOST |
|---|---|---|
| HD | 100 min. | 450 min. |
| FDAD | 245 min. | 300 min. |
| FDED | | 240 min. |

CONCLUSION: THE RANGE OF TIME USED FOR MATH SKILLS IN THE FULL-DAY ALTERNATE-DAY CLASSES AND THE FULL-DAY EVERY-DAY CLASS FELL WITHIN THE RANGE OF TIME USED TO TEACH MATH SKILLS IN THE HALF-DAY CLASSES, SO THE THREE MODELS WERE CONSIDERED EQUAL FOR THIS SUBJECT.

## WAS THERE A DIFFERENCE BETWEEN THE MODELS IN TIME FOR CHILD INITIATED CONVERSATION AND INTERACTION?

FINDINGS: OBSERVERS RECORDED FOR EACH ACTIVITY IN ALL KINDERGARTEN MODELS WHETHER OR NOT THE CHILD WAS FREE TO MOVE ABOUT AND TALK, AND WHETHER THE ATTENTION FOCUS WAS ON THE TEACHER OR ON OTHER CHILDREN (IN TURN). THIS PROVIDED A PROFILE OF HOW MUCH OPPORTUNITY THERE WAS FOR CHILDREN TO INTERACT WITH OTHER CHILDREN, AND TO INITIATE CONVERSATION.

RESULTS: Nonacademic activities permitting child interaction and conversation included snack periods, lunch, recess, and cleanup periods after art or center activities.

Academic activities permitting child conversation and interaction included center time (small group activities), "sharing" time, language experience field trips or cooking activities, and creative dramatics. Most art activities allowed for movement and conversation, and many science activities did so (if these involved hands-on materials). "Library" time usually allowed free movement but sometimes restricted conversation.

As shown in the table below, on the average, there was very little difference between the half-day and the full-day alternate-day programs in the time used for academic activities which permitted child interaction and child initiated conversation. Adding in the time spent in nonacademic activities, however, the full-day alternate-day model had significantly more time for child initiated conversation and interaction. The full-day every-day model had roughly twice as much time in this type of activity as the other two models.

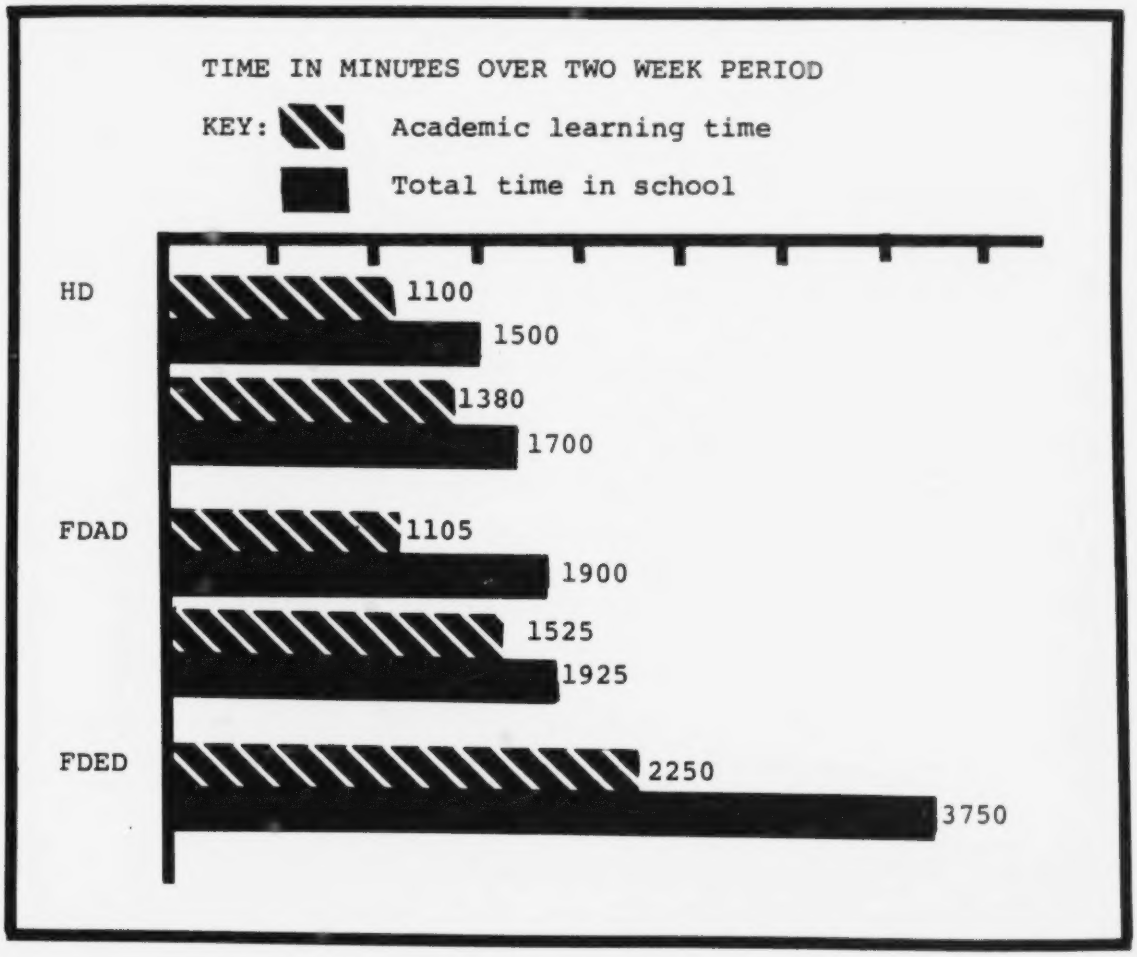
RANGE OF TIME IN MINUTES OVER A TWO WEEK PERIOD

| Model | Academic Activities | Average | Nonacademic Activities | Average | Total |
|---|---|---|---|---|---|
| HD | 325-600 | 440 | 90-260 | 160 | 600 |
| FDAD | 365-525 | 445 | 275-495 | 385 | 835 |
| FDED | 925 | 925 | 1050 | 1050 | 1975 |

CONCLUSION: THE FULL-DAY MODELS PROVIDED SIGNIFICANTLY MORE TIME THAN THE HALF-DAY MODEL FOR CHILDREN TO INTERACT WITH OTHER CHILDREN AND TO INITIATE CONVERSATION.

## WAS THERE A DIFFERENCE BETWEEN THE THREE KINDERGARTEN MODELS IN TOTAL TIME IN SCHOOL, AND IN ACADEMIC LEARNING TIME?

FINDINGS: BECAUSE OF BUS SCHEDULES, TOTAL TIME IN SCHOOL VARIED WITHIN THE MODELS AS SHOWN IN FIGURE BELOW. ACADEMIC LEARNING TIME ALSO VARIED. ACADEMIC LEARNING TIME EXCLUDED TIME SCHEDULED FOR LUNCH, SNACKS, NAPS, RECESS, AND TIME SET ASIDE FOR "CLEAN-UP", "GET READY FOR LUNCH", AND "PREPARE FOR GOING HOME".



CONCLUSION: CHILDREN IN THE FULL-DAY ALTERNATE-DAY MODEL HAD FROM 225 TO 425 MINUTES MORE TOTAL TIME IN SCHOOL EACH TWO WEEKS THAN CHILDREN ATTENDING HALF-DAY EVERY-DAY. USE OF SCHOOL TIME DIFFERED SO THAT FULL-DAY ALTERNATE-DAY CHILDREN HAD THE SAME OR LESS ACADEMIC LEARNING TIME THAN CHILDREN IN HALF-DAY CLASSES IN ONE SCHOOL; MORE ACADEMIC LEARNING TIME IN THE OTHER SCHOOL USING THE FULL-DAY ALTERNATE-DAY MODEL. CHILDREN IN THE FULL-DAY EVERY-DAY MODEL HAVE FROM 725 TO 1150 MORE MINUTES OF ACADEMIC LEARNING TIME IN TWO WEEKS THAN EITHER OF THE OTHER TWO MODELS.

## WAS THERE A DIFFERENCE BETWEEN THE MODELS IN THE ATMOSPHERE OF THE CLASSROOM; WHETHER CHILDREN WERE RUSHED OR RELAXED?

FINDINGS: ADVOCATES OF THE ALL-DAY MODELS REPORTED THAT THE LEARNING DAY WAS MORE RELAXED; THAT IT WAS EASIER TO ACCOMODATE CHANGES WITHIN THE SCHEDULE WITHOUT SEEMING RUSHED. OBSERVERS WERE THEREFORE ASKED TO COMPARE THE CLASSROOMS THEY VISITED RESPONDING TO THE QUESTION:

> "OBSERVE THE GENERAL ATMOSPHERE OF THE ROOM AND WHETHER ONE SCHEDULE APPEARS MORE OR LESS HURRIED THAN THE OTHER."

RESULTS: The results were mixed. Sample comments: (about full-day classrooms) "her schedule does not seem hurried" "atmosphere was relaxed". (about half-day classrooms) "Her schedule is not hurried. However, her pace is continuous; her day flows nicely. No time is wasted." "The schedule was a bit juggled the day I visited, and due to this it seemed a bit hurried trying to accomplish all the activities." (comparing models) "Of the three classrooms I saw, the morning kindergarten and alternate day were less hurried. The afternoon kindergarten was somewhat more hectic, but not that much different." "Full-day does not seem any less hurried than half-day."

The concensus seemed to be that classroom atmosphere was more a matter of teacher style than scheduling; and was affected by any kind of disruption (for special events, shortened day, new students or returning students who need to be caught up on something.) It was also a function of how much work the teacher was trying to accomplish. The half-day teacher in a school with an alternate day classroom felt very hurried trying to accomplish an equal number of activities when her schedule provided the equivalent of one whole day less (two and a half hours less academic time in a given week).

CONCLUSION: CLASSROOM ATMOSPHERE APPEARS TO BE RELATED MORE TO TEACHER STYLE THAN TO SCHEDULING.

## DID SOME PARTS OF THE DAY APPEAR TO BE LESS PRODUCTIVE FOR LEARNING IN ONE SCHEDULE OR THE OTHER?

FINDINGS: OBSERVERS VISITED BOTH FULL-DAY AND HALF-DAY KINDERGARTENS RECORDING ACTIVITY THROUGHOUT THE DAY AND ANSWERING A SERIES OF QUESTIONS IN WHICH THEY WERE ASKED TO COMPARE PROGRAMS BASED ON OBSERVED BEHAVIOR. (THESE OBSERVERS INCLUDED THE CURRICULUM DIRECTOR, THREE PRINCIPALS, THREE ADMINISTRATERS OF SPECIAL PROGRAMS, FOUR TEACHERS--INCLUDING THREE WHO TAUGHT HALF-DAY AND ONE ALTERNATE-DAY, THREE PARENTS, AND THE RESEARCH SPECIALIST.) ONE OF THE COMPARISON QUESTIONS ASKED WAS:

> "DID SOME PARTS OF THE DAY APPEAR TO BE LESS PRODUCTIVE FOR LEARNING IN ONE SCHEDULE OR THE OTHER."

THIS QUESTION WAS BASED ON THE CONCERN THAT TIME MIGHT NOT BE AS WELL USED IN A FULL-DAY PROGRAM IF THE CHILDREN WERE TOO FATIGUED TO BE RECEPTIVE TO LEARNING IN THE AFTERNOON.

RESULTS: All of the observers responded that in the full-day programs, the total day was effective learning time. Sample responses were:

> "Afternoon was as productive as the morning."
>
> "The schedule did not appear to cause less productive learning."
>
> "The pace was good. It did not generally appear that time was wasted."
>
> "For a few minutes after lunch the class appeared to be tired. It was not long before they got their 'second wind' and started off again."

**CONCLUSION: THE FULL-DAY SCHEDULE DOES NOT APPEAR TO RESULT IN LESS PRODUCTIVE LEARNING TIME THAN THE HALF-DAY SCHEDULE.**

## WAS THERE A DIFFERENCE BETWEEN THE MODELS IN COMMUNICATION WITH PARENTS AND PARENT INVOLVEMENT IN LEARNING?

FINDINGS: OBSERVERS OF EACH OF THE KINDERGARTEN MODELS COLLECTED INFORMATION ON HOW THE TEACHER COMMUNICATED WITH PARENTS; WHETHER ANY TYPE OF "HOME WORK" WAS SENT HOME, AND HOW MANY PARENTS VOLUNTEERED IN THE CLASSROOM.

RESULTS: There appeared to be no difference between the models in frequency of communication with parents. All teachers reported regular letters sent home. Many included games or suggested activities through which parents could help their children learn concepts. Children in all three were encouraged to bring in objects that related to the letter of the week, etc.

There was a difference in the number of parents who volunteered in the classroom, but it did not appear to be related (except incidentally) to the scheduling models. In general there appeared to be two primary factors that affected numbers of parent volunteers. (1) The affluence of children in the classroom; (2) The amount of effort outside of class hours the teacher was able or willing to put in to recruit and train parent volunteers.

In general the more affluent the children, the more parents willing and able to volunteer to help. For the same teacher there would be a difference between one class and another: The "local" class of middle to upper class parents produced a number of enthusiastic volunteers; the "bus" class of children brought in from poorer sections of town would have no available volunteers. The all-day every-day classroom teacher reported no parent volenteers. (Hers was the least affluent group of parents in the district--see demographic data presented earlier). Both alternate-day teachers had some parent volunteers. Eight of ten half-day teachers had "some". Two half-day teachers reported no parent volunteers. Another two half-day teachers had an extraordinary number of parent volunteers--and reported that they spent hours recruiting and training same.

CONCLUSION: INVOLVEMENT OF PARENTS IN A CHILD'S LEARNING APPEARS TO BE RELATED TO FACTORS OTHER THAN SCHEDULING AND LENGTH OF THE KINDERGARTEN DAY.

## WAS THERE A DIFFERENCE BETWEEN THE MODELS IN CHILDREN'S ABILITY TO LEARN CONCEPTS INVOLVING SEQUENCE?

FINDINGS: OBSERVERS OF EACH OF THE KINDERGARTEN MODELS RECORDED ACTIVITY THROUGHOUT THE DAY AND ANSWERED QUESTIONS COMPARING PROGRAMS BASED ON OBSERVED BEHAVIOR. (OBSERVERS INCLUDED ADMINISTRATERS, TEACHERS, PARENTS, AND THE RESEARCH SPECIALIST.)

ONE CONCERN ABOUT THE ALTERNATE-DAY PROGRAM WAS THAT AN INTERMITTENT SCHEDULE MIGHT HAMPER CHILDREN IN THEIR ABILITY TO LEARN CONCEPTS THAT INVOLVED SEQUENCE. OBSERVERS WERE THEREFORE ASKED TO COMPARE THE MODELS IN RESPONSE TO THIS QUESTION:

> "OBSERVE WHETHER CHILDREN SEEM TO UNDERSTAND AND RESPOND MORE READILY IN ACTIVITIES INVOLVING SEQUENCE (CALENDAR, FOR EXAMPLE) IN ONE SCHEDULE OR THE OTHER. HOW DO TEACHERS TREAT NON SCHOOL DAYS (FROM INTERMITTENT SCHEDULE, OR WEEKENDS, OR HOLIDAYS) IF THIS OCCURS. (IF IT DOESN'T, ASK ABOUT IT.)"

RESULTS: None of the observers reported any difference between models in response to this question. Sample responses were: "Children in both groups appeared to have no problems in understanding sequence and other calendar related activities." "Children seemed to respond readily--calendar, rules, procedures."

Teachers in all three kindergarten models included lessons involving sequence: growing plants; hatching eggs; sequence of seasons; first, next, last. None reported that the children had any trouble in grasping these concepts.

One test administered to the children involved following directions (a sequence of instructions to be followed in order). On this test the full-day every-day students did best, the full-day alternate-day students next best, and the half-day students had the lowest average score (no statistically significant difference between the scores, however.)

CONCLUSION: CHILDREN IN FULL-DAY AND HALF-DAY SCHEDULES APPEAR TO BE ABLE TO LEARN CONCEPTS INVOLVING SEQUENCE EQUALLY WELL.

## HOW WELL ARE THE DIFFERENT MODELS ACCEPTED BY PARENTS ENROLLED IN THAT MODEL?

FINDINGS: THE PATTERN OF RESPONSES INDICATED THAT PARENTS TEND TO LIKE WHAT THEY HAVE, AS SHOWN IN THE FIGURES BELOW.

| N | MODEL | % OF PARENTS FROM EACH MODEL SELECTING THAT MODEL AS THEIR FIRST CHOICE | % OF PARENTS CHOOSING A HALF-DAY MODEL | % OF PARENTS CHOOSING A FULL-DAY MODEL | PERCENT REPORTING THEIR MODEL HAD WORKED WELL FOR THEM |
|---|---|---|---|---|---|
| 89 | HD-AM | 79% | 80% | 20% | 99% |
| 63 | HD-PM | 33% | 60% | 40% | 90% |
| 47 | FDAD | 49% | 21% | 79% | 85% |
| 6 | FDED | 67% | 34% | 67% | 100% |

CONCLUSION: THE MAJORITY OF PARENTS WITH CHILDREN IN FULL-DAY PROGRAMS PREFER A FULL-DAY PROGRAM AND FEEL IT WORKED WELL FOR THEM; THE MAJORITY IN HALF-DAY PROGRAMS PREFER HALF-DAY AND FEEL IT WORKED WELL.

THE MOST PREFERRED MODEL WAS HALF-DAY MORNINGS; THE LEAST PREFERRED HALF-DAY AFTERNOONS. THE ORDER OF PREFERENCE APPEARS TO BE DIRECTLY CORRELATED TO THE ACCESS TO MORNING LEARNING TIME.

## EVALUATION OF ECE, PASCO'S PREKINDERGARTEN PROGRAM

Pasco school has funded a prekindergarten program for a limited number of children since 1974 using a combination of federal and local funds. The targeted group of children for this program were "high risk" children, primarily those whose home language was not English and who had limited preacademic skills as well because of poverty. To provide academic and language models for these children, the program has also served up to 40% "mainstream" children. Details of the numbers of children served and the staffing for this program were given in the introductory section to this report.

The ECE program has done pre and post test evaluation since the 1982-83 school year, using the Wide Range Achievement Test and the Peabody Picture Vocabulary test. As part of the current study, the test scores were analyzed for Wave 1 (1982-83), Wave 2 (1983-84) and Wave 3 (1984-85). The first figure shows gains during the ECE year for all three waves combined. The U.S. Office of Education considers a gain of one-third standard deviation to be educationally significant. Since the standard deviation on this test is 15, a gain of 5 points would be considered educationally significant. As illustrated on the figure which follows, the average gain for target children of 10 in math, 7 in reading, and 14 in handwriting skills all exceed this standard. The extremely low level of initial skills of children is shown by the pretest levels, all well below the "normal range" indicated on the figure by the shaded area.

The language "model" children in the ECE program started out with scores in the low normal range, and made similar increases so that their final scores in math and reading were well above the national norms.

The second figure demonstrates that the two previous waves of target children made similar large gains in reading and math standard scores during the ECE year, but the kindergarten year did not further develop these skills. Kindergarten did produce further large gains in language (English vocabulary) however. The third figure illustrates this "leveling off" in gains in academic areas in kindergarten. The figure shows an actual gain in raw score, which actually represents a loss in standard score since the standard score is relative to the gain of other children at that age level. While kindergarten did not further children's academic skills, it did produce a very large gain in vocabulary.

In first grade, where children were presented with new academic materials, they "took off" making a very rapid gain, , and by the end of first grade target children were scoring, on the average, slightly above grade level in all subjects. These "high risk" children, initially rock bottom low in preacademic skills were progressing normally through the school system.

The figure which follows show the trend across the country for states to put funding into preschool programs. In the past about the only preschool programs funded through the schools served handicapped children. Four states were forerunners of funding preschool for more than just handicapped children: California, New Jersey, New York and Pennsylvania, which have had general funding for preschool for over ten years. Since 1980 eleven more states have started funding preschool. In 1986 an additional six states had legislation pending, including Washington state. With the strong support of Governor Booth Gardner, Washington state legislature passed an appropriation of nearly three million dollars to fund new preschool programs for "at risk" children in 1986.

The final figures in this study deal with "other issues" on which information was requested. The first shows the effect of "pull-out" programs in terms of what the children were missing when they left class and whether the supplementary help provided instruction in an equivalent area. The conclusion is that it is very difficult to have a child miss from 15 to 45 minutes regularly out of a two and a half hour program without missing basic instruction. The recommendation of the evaluator is that the committee look at other ways to use funding for supplementary programs to extend the kindergarten day as an alternative to the pull-out scheduling of these services.

The other two figures show the diversity of skills with which Pasco children are entering kindergarten. This demonstrates the need for effective programming to serve the very low group. It also shows that nearly half of the kindergarten children start kindergarten with a high level of academic readiness, and needing new challenges.

## ARE CHILDREN IN THE PASCO EARLY CHILDHOOD EDUCATION (ECE) PROGRAM FOR FOUR YEAR OLDS ACQUIRING PRE-ACADEMIC SKILLS?

FINDINGS: THE FIGURE BELOW SHOWS THE AVERAGE GAINS MADE IN THE ECE (EARLY CHILDHOOD EDUCATION) PROGRAM FOR CHILDREN ENROLLED 1982 THRU 1985. THE "PROGRAM" CHILDREN WERE SELECTED AS BEING "AT RISK" OF SCHOOL FAILURE: THE "LANGUAGE MODEL" CHILDREN WERE AVERAGE STUDENTS ENROLLE AS LANGUAGE MODELS.

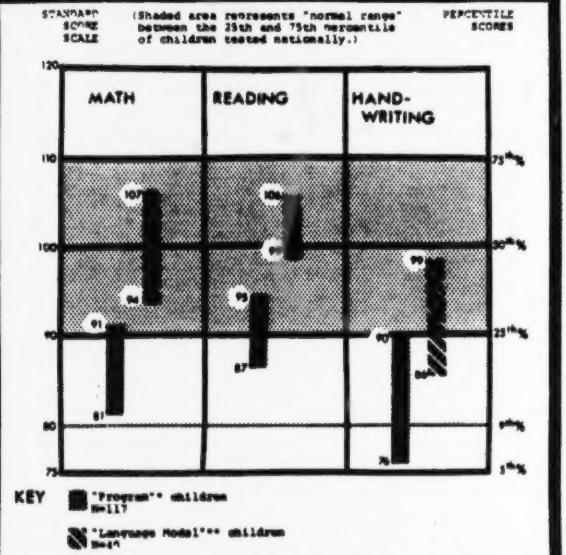


FIGURE 1. Gains in academic readiness skills by children in the Pasco ECE Program over a three year period, by program classification as measured by the Wide Range Achievement Test.

*Selected for program because of academic need. (see text)
**Selected to serve as English language models. (see text)

CONCLUSION:

THE PASCO ECE PROGRAM IS VERY POWERFUL PROGRAM TO HELP CHILDREN ACQUIRE BASIC PRE-ACADEMIC SKILLS. GAINS IN ALL THREE ACADEMIC AREAS ARE OVER FIVE POINTS, THE GAIN LEVEL CONSIDERED "EDUCATIONALLY SIGNIFICANT" BY THE U.S. OFFICE OF EDUCATION.

## IS THE KINDERGARTEN PROGRAM BUILDING ON GAINS CHILDREN MAKE IN ECE?

FINDINGS: THE TABLE BELOW SHOWS THE SCORES OF CHILDREN BEFORE AND AFTER THE ECE PREKINDERGARTEN YEAR, AND AFTER A YEAR OF KINDERGARTEN. THE DISADVANTAGED CHILDREN WERE THOSE SELECTED FOR THE PROGRAM BASED ON NEED; THE ADVANTAGED CHILDREN WERE ENROLLED TO SERVE AS LANGUAGE MODELS. AS SHOWN IN THIS TABLE, KINDERGARTEN CONTINUES TO BUILD LANGUAGE SKILLS, BUT DOES NOT FURTHER DEVELOP READING OR MATH SKILLS IF CHILDREN ENTER KINDERGARTEN WITH A HIGH LEVEL OF PREACADEMIC SKILLS IN THESE AREAS.

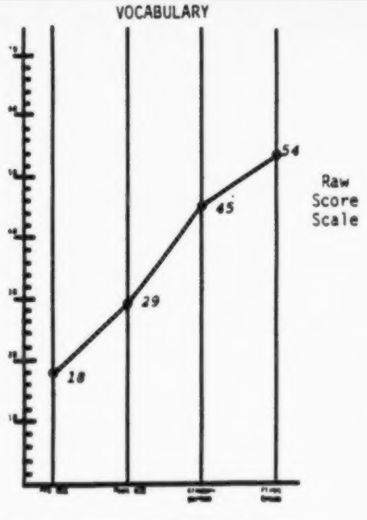
Test Scores of Children in ECE and after kindergarten

| Test and Group | Mean Standard Scores | | | | |
|---|---|---|---|---|---|
| | Pretest Before ECE | Posttest After ECE | ECE Gain | Posttest After Kinder. | Kinder. Gain |
| ENGLISH VOCAB. | | | | | |
| Disadvant. | | | | | |
| ECE 82-83 | 42 | 55 | +13 | 60 | + 5 |
| ECE 83-84 | 65 | 74 | + 9 | 88 | +14 |
| Advantaged | | | | | |
| ECE 82-83 | 94 | 100 | + 6 | 109 | + 9 |
| ECE 83-84 | 93 | 96 | + 3 | 103 | + 7 |
| READING | | | | | |
| Disadvant. | | | | | |
| ECE 82-83 | 88 | 96 | + 8 | 89 | - 7 |
| ECE 83-84 | 89 | 93 | + 4 | 95 | + 2 |
| Advantaged | | | | | |
| ECE 82-83 | 102 | 106 | + 4 | 104 | - 2 |
| ECE 83-84 | 102 | 106 | + 4 | 106 | + 0 |
| ARITHMETIC | | | | | |
| Disadvant. | | | | | |
| ECE 82-83 | 87 | 100 | +13 | 93 | - 7 |
| ECE 83-84 | 83 | 93 | +10 | 95 | + 2 |
| Advantaged | | | | | |
| ECE 82-83 | 97 | 112 | +15 | 103 | - 9 |
| ECE 83-84 | 101 | 108 | + 7 | 106 | - 2 |

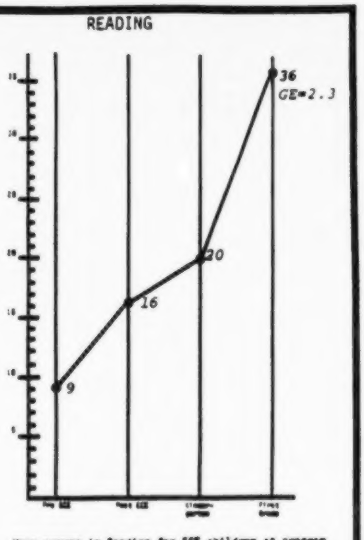
CONCLUSION: THE PASCO KINDERGARTEN PROGRAM IS EFFECTIVE IN BUILDING LANGUAGE SKILLS. FOR CHILDREN WHO ENTER WITH STRONG PREACADEMIC SKILLS IT IS NOT EFFECTIVE IN PROVIDING FURTHER DEVELOPMENT OF THESE SKILLS.

## HOW ARE ECE PROGRAM CHILDREN DOING BY THE END OF FIRST GRADE?

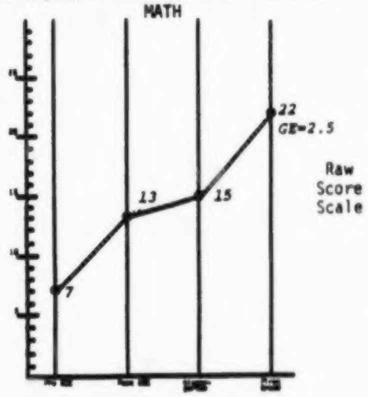
FINDINGS: THE FIGURE BELOW SHOWS GAINS BY ECE CHILDREN FROM ENTRY TO ECE THROUGH FIRST GRADE. TESTED NEAR THE END OF FIRST GRADE (GE=1.8) THEIR AVERAGE SCORE IN READING, MATH, AND SPELLING WAS AT SECOND GRADE LEVEL IN ALL SUBJECTS.



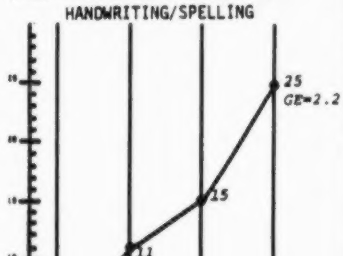
Mean scores in English vocabulary for ECE children at program entry, and at the end of ECE, kindergarten, and first grade, on the Peabody Picture Vocabulary Test.



Mean scores in Reading for ECE children at program entry, and at the end of ECE, kindergarten and first grade, on the Wide Range Achievement Test.



Mean scores in Math for ECE children at program entry, and at the end of ECE, kindergarten and first grade, on the Wide Range Achievement Test.



Mean scores in Handwriting/Spelling for ECE children at program entry, and at the end of ECE, kindergarten and first grade, on the Wide Range Achievement Test.

CONCLUSION: CHILDREN WHO ENTERED THE ECE PROGRAM AT A VERY LOW SKILL LEVEL ARE MAKING NORMAL ACADEMIC PROGRESS AT THE END OF FIRST GRADE.

## HOW WAS THE KINDERGARTEN SCHEDULE AFFECTED BY CHILDREN LEAVING THE CLASSROOM FOR SPECIAL HELP?

FINDINGS: NO CHILDREN WERE TAKEN OUT OF THE ALL-DAY EVERY-DAY CLASSROOM SINCE INDIVIDUALIZED INSTRUCTION WAS AVAILABLE THROUGH THE FULL-TIME AIDE. UP TO 25% OF THE CHILDREN IN OTHER CLASSES WERE REGULARLY TAKEN OUT OF CLASS FOR REMEDIAL HELP, ENGLISH LANGUAGE INSTRUCTION, OR SPEECH THERAPY. THE KINDERGARTEN DAY WAS SO SHORT THAT IT WAS NOT ALWAYS POSSIBLE TO ARRANGE THIS "PULL OUT" SO THE CHILD DID NOT MISS BASIC ACADEMIC INSTRUCTION. THE FOLLOWING TABLE SHOWS THE ACADEMIC CONTENT MISSED BY CHILDREN LEAVING FOR SPECIAL INSTRUCTION. TIME OUT OF CLASS VARIED FROM 40 MINUTES TO 240 MINUTES DURING A TWO WEEK PERIOD.

| Number of Teachers Reporting Children out During this Period. | Activity, and academic content of work missed by these children. | Whether Teachers felt child received comparable instruction from specialist during this time. |
|---|---|---|
| 6 | OPENING (Oral language practice, sharing, number and time sequence, patterning, counting skills.) | 6 No |
| 3 | LARGE GROUP MATH (The initial presentation of math concept of the week, explanation of how to do math center activities.) | 2 No<br>1 Yes |
| 7 | LARGE GROUP READING (Initial presentation of "letter person" of the week, review of letters, sounds.) | 5 No<br>2 Yes |
| 5 | CENTERS (Math activities, reading activities, art, language arts, socialization activities.) | 3 No<br>2 Yes |
| 7 | OTHER (1-Large group science or social studies, 5-language arts activities including storytime, library, writing, or language experience stories; 1-recess.) | 6 No<br>1 Yes |

CONCLUSION: SCHEDULING OF CHILDREN FOR OUT OF CLASSROOM SPECIAL INSTRUCTION FREQUENTLY CAUSED THESE CHILDREN TO MISS BASIC INSTRUCTION. ANY POSSIBLE REALLOCATION OF RESOURCES TO PROVIDE AIDES TO CLASSROOM TEACHERS OR EXTEND THE LENGTH OF THE KINDERGARTEN DAY FOR CHILDREN WITH SPECIAL NEEDS WOULD APPEAR TO BE MORE BENEFICIAL TO CHILDREN.

## HOW IS THE SCHOOL READINESS OF CHILDREN AFFECTED BY PRESCHOOL PROGRAMS?

FINDINGS: AS SHOWN IN THE FIGURES BELOW, OVER TWO-THIRDS OF THE CHILDREN OF PARENTS RESPONDING TO THE PARENT SURVEYS HAVE BEEN IN PRESCHOOL PROGRAMS. OVERWHELMINGLY, PARENTS FEEL PRESCHOOL HAS IMPROVED THEIR CHILD'S READINESS FOR KINDERGARTEN.

PERCENT OF CHILDREN BY MODEL WHO HAVE ATTENDED PRESCHOOLS

| N | MODEL | % ATTENDED PRESCHOOL |
|---|---|---|
| 90 | HD - AM | 68% |
| 62 | HD - PM | 62% |
| 45 | FD - AD | 69% |
| 6 | FD - ED | 67% |
| All Models<br>N = 203 | | 66.5% |

PERCENT OF CHILDREN WHOSE PRESCHOOL MET:

| FULL DAYS | FIVE OR MORE DAYS A WEEK |
|---|---|
| 60% | 45% |

PERCENT OF CHILDREN WHOSE PRESCHOOL HAD:

| AN EDUCATIONAL PROGRAM | MADE THEM MORE READY FOR KINDERGARTEN |
|---|---|
| 83% | 90% |

CONCLUSION: A VERY HIGH PERCENTAGE OF CHILDREN HAVE PREVIOUS PRESCHOOL EXPERIENCE, WHICH PARENTS FEEL HAS INCREASED THE LEVEL OF SOCIAL AND ACADEMIC SKILLS THEY BRING TO KINDERGARTEN. THE MAJORITY OF CHILDREN IN PRESCHOOLS WERE ACCUSTOMED TO PROGRAMS LONGER THAN HALF-DAY.

## WHAT PERCENTAGE OF STUDENTS WOULD BE CONSIDERED HIGH-RISK ON THE BASIS OF LOW PRE-ACADEMIC SKILLS STARTING KINDERGARTEN?

FINDINGS: THE FOLLOWING PERCENTAGES OF CHILDREN HAD ACQUIRED NONE OF THE SKILLS IN PRE-READING, PRE-MATH, AND PRESCHOOL CONCEPTS LISTED BELOW BY THE FIRST QUARTER REPORT CARDS.

| Pre-Reading Skills | None |
|---|---|
| Can name capital letters | 6% |
| Can name small letters | 15% |
| **Pre-Math Skills** | |
| Rote counting | 1% |
| Can count objects | 13% |
| Can name numerals | 5% |
| **Preschool Concepts** | |
| Knows shapes | 6% |
| Knows colors | 1% |

Of the 573 report cards, missing data represents 32% of total in reading, 28% in math, and 17% in preschool concepts.

CONCLUSION: EARLY IN THE KINDERGARTEN YEAR, UP TO 15% OF KINDERGARTEN CHILDREN HAD NO PRE-ACADEMIC SKILLS IN LETTER RECOGNITION, COUNTING, NUMERAL RECOGNITION, AND NAMING OF COLORS AND SHAPES.

## WHAT PERCENTAGE OF STUDENTS HAVE ACQUIRED KINDERGARTEN PRE-ACADEMIC SKILLS BEFORE KINDERGARTEN?

FINDINGS: THE FOLLOWING PERCENTAGES OF CHILDREN HAD ACQUIRED MOST OF THE REPORT CARD SKILLS IN PRE-READING, PRE-MATH, AND PRESCHOOL CONCEPTS LISTED BELOW BY THE FIRST QUARTER REPORT CARDS.

| Pre-Reading Skills | High Level of Skills | |
|---|---|---|
| Can name capital letters | 41% | (17+) |
| Can name small letters | 27% | (16+) |
| Recognizes initial consonants | 41% | (16+) |
| Pre-Math Skills | | |
| Rote counting | 60% | (16+) |
| Can count objects | 63% | (16+) |
| Can name numerals | 51% | (16+) |
| Can count objects in a set | 44% | (16+) |
| Preschool Concepts | | |
| Knows shapes | 63% | ( 4+) |
| Knows colors | 91% | ( 7+) |

Of the 573 report cards, missing data represents 32% of total in reading, 22% in math, and 17% in preschool concepts.

CONCLUSION: EARLY IN THE KINDERGARTEN YEAR, FORTY TO FIFTY PERCENT OF PASCO KINDERGARTEN CHILDREN START THE YEAR WITH AN ADVANCED LEVEL OF SKILLS IN MATH AND PHONICS.

## APPENDIX

### TABLE 1

Statistical Comparison of All Three Kindergarten Models

| | HD-ED* | | FD-AD* | | FD-ED* | | |
|---|---|---|---|---|---|---|---|
| Test | N | Mean Stand. Score | N | Mean Stand. Score | N | Mean Stand. Score | ANOVA Prob.* |
| LANGUAGE TESTS (Receptive) | | | | | | | |
| Peabody Picture Vocabulary Test | 127 | 90.4 | 38 | 98.9 | 18 | 94.7 | <.04 |
| Following Directions | 127 | 7.4 | 38 | 7.7 | 18 | 7.8 | <.53 |
| Spatial Motoric (placing objects in, over, etc.) | 127 | 9.4 | 38 | 9.6 | 18 | 9.3 | <.54 |
| (Expressive) | | | | | | | |
| Spatial Verbal (Telling where object is over, under, etc.) | 127 | 7.9 | 38 | 7.8 | 18 | 8.1 | <.91 |
| Answering Questions | 127 | 9.1 | 38 | 9.5 | 18 | 9.3 | <.17 |
| Doing Analogies | 127 | 12.9 | 38 | 13.3 | 18 | 13.1 | <.61 |
| READING SKILLS | | | | | | | |
| WRAT* Reading Subtest | 127 | 99.2 | 38 | 98.3 | 18 | 98.2 | <.91 |
| Naming Letters | 127 | 28.9 | 38 | 26.9 | 18 | 34.3 | <.22 |
| MATH SKILLS | | | | | | | |
| WRAT* Math Subtest | 127 | 98.4 | 38 | 98.6 | 18 | 95.1 | <.49 |
| Number Recognition | 127 | 40.6 | 38 | 39.6 | 18 | 37.9 | <.79 |
| Telling Quantities | 127 | 9.3 | 38 | 8.9 | 18 | 9.1 | .35 |
| OTHER ACADEMIC | | | | | | | |
| WRAT* Handwriting | 127 | 94.0 | 38 | 95.2 | 18 | 88.7 | <.20 |
| Naming Colors | 127 | 21.9 | 38 | 21.9 | 18 | 20.9 | <.76 |

* HD-ED = Half-Day Every-Day

* FD-AD = Full-Day Alternate-Day

* FD-ED = Full-Day Every-Day

* Prob. refers to the probability that this much difference could occur by chance. A probability of <.05 or less (i.e. less than 5 chances in 100) is considered statistically "significant".

* WRAT = Wide Range Achievement Test. Handwriting is measured by the spelling subtest on WRAT.

## TABLE 2

### Statistical Comparison of Half-Day Every-Day with Full-Day Alternate-Day

| | HD-ED* | | FD-AD* | | |
|---|---|---|---|---|---|
| Test | *N* | Mean Stand. Score | *N* | Mean Stand. Score | T-Test Prob.* |
| LANGUAGE TESTS (Receptive) | | | | | |
| Peabody Picture Vocabulary Test | 127 | 90.4 | 38 | 98.9 | <.00 |
| Following Directions | 127 | 7.4 | 38 | 7.7 | <.42 |
| Spatial Motoric (placing objects in, over, etc.) | 127 | 9.4 | 38 | 9.6 | <.22 |
| (Expressive) | | | | | |
| Spatial Verbal (Telling where object is over, under, etc.) | 127 | 7.9 | 38 | 7.8 | <.93 |
| Answering Questions | 127 | 9.1 | 38 | 9.5 | <.04 |
| Doing Analogies | 127 | 12.9 | 38 | 13.3 | <.34 |
| READING SKILLS | | | | | |
| WRAT* Reading Subtest | 127 | 99.2 | 38 | 98.3 | <.72 |
| Naming Letters | 127 | 28.9 | 38 | 26.9 | <.48 |
| MATH SKILLS | | | | | |
| WRAT* Math Subtest | 12 | 98.4 | 38 | 98.6 | <.96 |
| Number Recognition | 127 | 40.6 | 38 | 39.6 | <.74 |
| Telling Quantities | 127 | 9.3 | 38 | 8.9 | <.26 |
| OTHER ACADEMIC | | | | | |
| WRAT* Handwriting | 127 | 94.0 | 38 | 95.2 | <.62 |
| Naming Colors | 127 | 21.9 | 38 | 21.9 | <.98 |

* HD-ED = Half-Day Every-Day

* FD-AD = Full-Day Alternate-Day

* Prob. refers to the probability that this much difference could occur by chance. A probability of <.05 or less (i.e. less than 5 chances in 100) is considered statistically "significant".

* WRAT = Wide Range Achievement Test. Handwriting is measured by the spelling subtest on WRAT.

## TABLE 3

## Statistical Comparison of Half-Day Every-Day with Full-Day Every-Day

| | HD-ED* | | FD-ED* | | |
|---|---|---|---|---|---|
| Test | *N* | Mean Stand. Score | *N* | Mean Stand. Score | T-Test Prob.* |
| LANGUAGE TESTS (Receptive) | | | | | |
| Peabody Picture Vocabulary Test | 127 | 90.4 | 18 | 94.7 | < .39 |
| Following Directions | 127 | 7.4 | 18 | 7.8 | < .35 |
| Spatial Motoric (placing objects in, over, etc.) | 127 | 9.4 | 18 | 9.3 | < .91 |
| (Expressive) | | | | | |
| Spatial Verbal (Telling where object is over, under, etc.) | 127 | 7.9 | 18 | 8.1 | < .70 |
| Answering Questions | 127 | 9.1 | 18 | 9.3 | < .42 |
| Doing Analogies | 127 | 12.9 | 18 | 13.1 | < .67 |
| READING SKILLS | | | | | |
| WRAT* Reading Subtest | 127 | 99.2 | 18 | 98.2 | < .75 |
| Naming Letters | 127 | 28.9 | 18 | 34.3 | < .14 |
| MATH SKILLS | | | | | |
| WRAT* Math Subtest | 127 | 98.4 | 18 | 95.1 | < .22 |
| Number Recognition | 127 | 40.6 | 18 | 37.9 | < .51 |
| Telling Quantities | 127 | 9.3 | 18 | 9.1 | < .51 |
| OTHER ACADEMIC | | | | | |
| WRAT* Handwriting | 127 | 94.0 | 18 | 88.7 | < .10 |
| Naming Colors | 127 | 21.9 | 18 | 20.9 | < .49 |

* HD-ED = Half-Day Every-Day

* FD-ED = Full-Day Every-Day

* Prob. refers to the probability that this much difference could occur by chance. A probability of <.05 or less (i.e. less than 5 chances in 100) is considered statistically "significant".

* WRAT = Wide Range Achievement Test. Handwriting is measured by the spelling subtest on WRAT.

# PART TWO

# EVALUATION OF EFFECTS OF ALTERNATE-DAY FULL-DAY KINDERGARTENS AND HALF-DAY EVERY-DAY KINDERGARTENS IN 1985-86

Second year of a two year study.

Report prepared by:

Beverly B. McConnell, PhD.

External Evaluator

Research and Evaluation Office

SW 615 Cityview, Pullman, WA 99163

## EXECUTIVE SUMMARY

This is a report comparing the gains made by children in a half-day every-day kindergarten, and in a full-day alternate-day kindergarten classes during the school year 1985-86. It is a follow-up study to a more extensive study comparing kindergarten scheduling models carried out in 1984-85.

The primary findings for the 1985-86 comparative study are:

The children in the full-day alternate-day kindergarten achieved higher post test scores than children in the half-day every day sample in 13 out of the 14 tests administered, but the differences were not statistically significant, after the adjustment for pretest differences.

Separate analysis compared the scores of poverty level children in the two models, and children who were above the poverty level. No statistically significant differences in the two programs were found when comparing the children above poverty level. However, the children who were below poverty level (defined as eligible for free or reduced lunch) had higher scores in both reading and math in the alternate-day program than their counterparts in the half-day model, and these differences were statistically significant. The poverty level children in the alternate-day program also had higher scores in English vocabulary and handwriting skills on standardized tests, and in nine out of ten of the kindergarten skills tests, but the differences on these other tests were not statistically significant. There were no tests on which children in the half-day every-day model achieved a significant superiority.

## INTRODUCTION

In 1984-85, Pasco School District carried out an extensive study of its kindergartens, including the effects of three different kindergarten schedules: the traditional half-day every-day model, another "half time" model in which children attended full-day on alternate days, and one classroom in which children attended full-day every day.

The 1984-85 study was initiated too late in the year to obtain pretests on the sample of children in all three models. Therefore it was carried out using the fall CTBS test which was given to all children in the district as a measure of comparability of children in pretest achievement levels, and only post tests were given on four standardized test instruments, plus a set of district skills tests.

The 1984-85 study found that in eleven of the thirteen tests there was no statistically significant difference in post test scores bvetween children in the two full-day alternate-day, and the half-day every-day kindergarten models. The children in the alternate-day full-day kindergarten had a statistically significant superiority in English vocabulary on a nationally standardized tests and in one of the district kindergarten skills tests.

Separate analyses of children who were above or below the poverty level, defined as eligible for free or reduced lunch, showed the alternate-day model to be more effective in most test areas, especially for poor children. The analysis by minority, non-minority, also found the alternate-day model generally more effective for non-white children, and the half-day every-day model more effective for white children.

The second year study was carried out primarily to see if these results would be replicated. It also was felt to be needed because it appeared that the evaluation of the third model, the full-day every-day program, had not received a fair test in reference to the other two models in the 1984-85 study. In the first year study, all but three of the children in the full-day every-day class were non-white and poor. The majority were limited English speaking, and of those who spoke English some had been selected because they had other learning problems. In the second year of program operation a better balance was achieved and it was possible to draw up a sample with approximately the same demographic characteristics between the three models.

A separate report has been made in which the full-day every-day kindergarten children are compared to the combined group of children who had half-time attendance either in half-day every-day or in full-day alternate-day models. This report will focus on the findings comparing children in the two half-time models, the alternate-day and the half-day programs.

Unfortunately in the second year study, the plan to have all children pre and post tested was not carried out. Testers giving the fall pretests eliminated one school from the sample of children that had been selected for the 1985-86 study. In the spring they gave post tests in this school so that the total sample was given post tests. This eliminated half the sample, 15 out of 31 children in the alternate-day program from pretesting, and 5 (out of 60) of the children in the half-day program.

Since all kindergarten children were given the district achievement test, the CTBS, in the fall, comparisons are available for the math and reading scores on this test for the total sample as a pretest measure. In the CTBS reading, the children in the half-day program had a slight superiority, in CTBS math the children in the alternate-day program a slight superiority -- the differences not statisticaly significant in either case. The groups also had a similar demographic makeup -- 52% poverty in the half-day sample and 55% poverty in the alternate-day sample. Among the children who were given pretests there were found to be no significant differences on any of the pretest measures. From this evidence it would appear that the total sample of children in the half-day and alternate-day models were approximately equal when they entered the program.

When post-test scores were analyzed for the total sample there were significant differences favoring the alternate-day full-day program in seven of the fourteen test instruments. However, using the more conservative analysis of covariance, which eliminated all but those children given both pre and post tests, the differences were generally found not be to be significant. From this it would appear that the non-pretested classroom of alternate-day children made larger gains during the kindergarten year than those of the classroom which did have both pre and post tests. To this extent the findings on the pages which follow may underestimate the effectiveness of the full-day alternate-day program.

## FINDINGS

The table below summarizes test scores of all children in the sample for 85 - 86.

### TABLE 1

### COMPARING SCORES OF CHILDREN IN HALF-DAY AND ALTERNATE-DAY KINDERGARTEN

| TEST/MODEL | N. | MEAN PRETEST | S.D. | PROB. | N. | MEAN POST-TEST | S.D. | PROB. | ADJUSTED PROB. |
|---|---|---|---|---|---|---|---|---|---|
| Eng. Vocab. | | | | | | | | | |
| Half/day | 55 | 74.7 | 27.4 | 0.34 | 55 | 88.6 | 21.8 | 0.11 | 0.63 |
| Alt./day | 16 | 81.9 | 23.0 | | 30 | 94.7 | 13.4 | | |
| Reading | | | | | | | | | |
| Half/day | 55 | 90.4 | 11.7 | 0.45 | 55 | 93.1 | 11.6 | 0.00 * | 0.26 |
| Alt./day | 16 | 92.8 | 8.9 | | 30 | 102.5 | 11.1 | ____ | |
| Spelling | | | | | | | | | |
| Half/day | 55 | 82.5 | 15.5 | 0.76 | 55 | 92.4 | 12.7 | 0.02 * | 0.39 |
| Alt./day | 16 | 81.1 | 13.6 | | 30 | 99.5 | 12.5 | ____ | |
| Math | | | | | | | | | |
| Half/day | 55 | 87.8 | 13.1 | 0.24 | 55 | 92.0 | 16.3 | 0.00 * | 0.07 |
| Alt./day | 16 | 92.3 | 13.3 | | 30 | 103.2 | | ____ | |
| CTBS Reading | | | | | | | | | |
| Half/day | 60 | 34.0 | 15.6 | 0.90 | | | | | |
| Alt./day | 31 | 33.6 | 14.0 | | | | | | |
| CTBS Math | | | | | | | | | |
| Half/day | 60 | 32.7 | 17.0 | 0.20 | | | | | |
| Alt./day | 31 | 37.3 | 14.1 | | | | | | |
| Colors | | | | | | | | | |
| Half/day | 50 | 17.9 | 7.9 | 0.61 | 55 | 21.4 | 5.7 | 0.72 | 0.27 |
| Alt./day | 15 | 16.7 | 8.3 | | 29 | 21.9 | 6.8 | | |
| Shapes | | | | | | | | | |
| Half/day | 50 | 8.8 | 4.7 | 1.00 | 55 | 12.2 | 6.5 | 0.92 | 0.74 |
| Alt./day | 15 | 8.8 | 5.3 | | 29 | 12.0 | 6.3 | | |
| Numbers | | | | | | | | | |
| Half/day | 50 | 23.6 | 14.7 | 0.83 | 55 | 35.9 | 16.6 | 0.03* | 0.33 |
| Alt./day | 15 | 22.7 | 16.9 | | 29 | 44.4 | 16.7 | ____ | |
| Letters | | | | | | | | | |
| Half/day | 50 | 12.6 | 13.3 | 0.92 | 55 | 24.0 | 16.7 | 0.05* | 0.36 |
| Alt./day | 15 | 13.1 | 18.4 | | 29 | 31.9 | 18.2 | ____ | |
| Quantities | | | | | | | | | |
| Half/day | 50 | 8.5 | 1.9 | 0.44 | 55 | 8.9 | 1.7 | 0.20 | 0.14 |
| Alt./day | 15 | 8.1 | 2.5 | | 29 | 9.4 | 1.3 | | |
| Spatial Verbal | | | | | | | | | |
| Half/day | 50 | 6.5 | 2.2 | 0.71 | 55 | 7.9 | 2.3 | 0.22 | 0.46 |
| Alt./day | 15 | 6.3 | 2.5 | | 29 | 8.5 | 1.8 | | |
| Spatial Motoric | | | | | | | | | |
| Half/day | 50 | 8.0 | 1.9 | 0.80 | 55 | 8.9 | 1.6 | 0.03* | 0.18 |
| Alt./day | 15 | 7.9 | 2.4 | | 29 | 9.5 | 1.1 | ____ | |
| Following Directions | | | | | | | | | |
| Half/day | 50 | 6.1 | 1.9 | 0.45 | 55 | 7.9 | 1.8 | 0.03* | 0.16 |
| Alt./day | 15 | 5.7 | 2.5 | | 29 | 8.8 | 1.6 | ____ | |
| Answering Questions | | | | | | | | | |
| Half/day | 50 | 7.7 | 2.3 | 0.91 | 55 | 9.2 | 1.4 | 0.32 | 0.40 |
| Alt./day | 15 | 7.8 | 2.5 | | 29 | 9.6 | 1.2 | | |
| Analogies | | | | | | | | | |
| Half/day | 50 | 10.4 | 3.3 | 0.07 | 55 | 12.9 | 2.7 | 0.41 | 0.42 |
| Alt./day | 15 | 14.2 | 13.3 | | 29 | 13.4 | 3.0 | | |

* = Statistically significant beyond .05 level

To summarize the findings in Table 1 which includes all children in the sample:

1. The groups were essentially alike at the beginning of the program year. None of the differences were statistically significant, (i.e. a probability of less the 0.05, or less than 5 chances in 100 that this much difference would occur by chance.)

2. At the end of the kindergarten year children in the alternate-day full-day kindergarten scored higher in 13 out of the 14 tests. In Seven of these tests differences were large enough to be statistically significant. This included three of the standardized tests, in reading, spelling (handwriting), and math. And it included four of the kindergarten skills tests in number, letters, spatial motoric (putting an object in, over, next to something) and following directions (e.g. point to the table, then the airplane, then the dog).

3. However in the adjusted probability, when differences in pretest scores were taken into account, the differences were no longer great enough to be statistically significant at the .05 level.

## TABLE 2.

## COMPARING SCORES OF POVERTY LEVEL CHILDREN ENROLLED IN HALF-DAY OR ALTERNATE-DAY KINDERGARTEN CLASSES 1985-86

| TEST/MODEL | N. | MEAN PRETEST | S.D. | PROB. | N. | MEAN POST-TEST | S.D. | PROB. | ADJUSTED PROB. |
|---|---|---|---|---|---|---|---|---|---|
| English Vocab. | | | | | | | | | |
| Half/day | 29 | 71.9 | 23.1 | 0.46 | 30 | 84.9 | 15.8 | 0.29 | 0.52 |
| Alt./day | 12 | 78.0 | 25.5 | | 16 | 89.9 | 14.0 | | |
| Reading | | | | | | | | | |
| Half/day | 29 | 88.1 | 10.9 | 0.12 | 30 | 90.6 | 9.6 | 0.00* | 0.00* |
| Alt./day | 12 | 93.5 | 7.3 | | 16 | 104.1 | 10.0 | | |
| Spelling | | | | | | | | | |
| Half/day | 29 | 80.6 | 13.8 | 0.68 | 30 | 89.4 | 12.8 | 0.02* | 0.19 |
| Alt./day | 12 | 82.6 | 13.8 | | 16 | 99.2 | 14.2 | | |
| Math | | | | | | | | | |
| Half/day | 29 | 88.9 | 12.6 | 0.54 | 30 | 93.8 | 9.2 | 0.00* | 0.00* |
| Alt/day | 12 | 91.8 | 14.4 | | 16 | 104.5 | 10.0 | | |
| CTBS Reading | | | | | | | | | |
| Half/day | 31 | 34.4 | 0.5 | 0.52 | | | | | |
| Alt./day | 17 | 31.4 | 14.9 | | | | | | |
| CTBS Math | | | | | | | | | |
| Half/day | 31 | 35.5 | 16.5 | 0.27 | | | | | |
| Alt./day | 17 | 40.7 | 14.0 | | | | | | |
| Colors | | | | | | | | | |
| Half/day | 26 | 18.2 | 7.7 | 0.64 | 30 | 21.6 | 5.7 | 0.95 | 0.19 |
| Alt./day | 11 | 16.9 | 8.3 | | 16 | 21.4 | 7.2 | | |
| Shapes | | | | | | | | | |
| Half/day | 26 | 8.5 | 4.3 | 0.95 | 30 | 11.7 | 5.9 | 0.81 | 0.35 |
| Alt./day | 11 | 8.6 | 4.1 | | 16 | 12.2 | 6.2 | | |
| Numbers | | | | | | | | | |
| Half/day | 26 | 23.6 | 12.1 | 0.81 | 30 | 35.3 | 13.5 | 0.12 | 0.20 |
| Alt./day | 11 | 24.8 | 16.2 | | 16 | 42.6 | 17.0 | | |
| Letters | | | | | | | | | |
| Half/day | 26 | 10.6 | 11.0 | 0.89 | 30 | 22.0 | 13.6 | 0.16 | 0.39 |
| Alt./day | 11 | 11.2 | 13.2 | | 16 | 28.8 | 18.3 | | |
| Quantities | | | | | | | | | |
| Half/day | 26 | 8.8 | 1.7 | 0.22 | 30 | 8.9 | 1.8 | 0.28 | 0.26 |
| Alt./day | 11 | 8.0 | 1.8 | | 16 | 9.4 | 1.4 | | |
| Spatial Verbal | | | | | | | | | |
| Half/day | 26 | 7.9 | 1.6 | 0.68 | 30 | 7.8 | 2.2 | 0.73 | 0.11 |
| Alt./day | 11 | 6.6 | 2.3 | | 16 | 8.0 | 2.0 | | |
| Spatial Motoric | | | | | | | | | |
| Half/day | 26 | 7.9 | 1.6 | 0.68 | 30 | 8.7 | 1.5 | 0.08 | 0.21 |
| Alt./day | 11 | 8.1 | 1.6 | | 16 | 9.4 | 1.2 | | |
| Following Directions | | | | | | | | | |
| Half/day | 26 | 6.2 | 1.8 | 0.36 | 30 | 7.9 | 1.9 | 0.24 | 0.33 |
| Alt./day | 11 | 5.5 | 2.2 | | 16 | 8.5 | 1.9 | | |
| Answering Questions | | | | | | | | | |
| Half/day | 26 | 7.3 | 2.2 | 0.20 | 30 | 8.9 | 1.6 | 0.53 | 0.37 |
| Alt./day | 11 | 8.3 | 1.7 | | 16 | 9.3 | 1.6 | | |
| Analogies | | | | | | | | | |
| Half/day | 26 | 10.0 | 3.0 | 0.63 | 30 | 12.4 | 2.8 | 0.64 | 0.41 |
| Alt./day | 11 | 10.5 | 3.5 | | 16 | 12.9 | 3.9 | | |

* = Statistically significant beyond the .05 level.

To summarize the findings in Table 2 which includes only those children who are below poverty level in the two models:

1. The children were very similar when they entered the program. Looking down the pretest scores some are slightly higher for one program, some for the other, but the differences are not statistically significant on any of the fourteen tests used for pre and post testing, nor for the fall scores in reading and math on the District achievement test, the CTBS.

2. At the end of the kindergarten year children in the alternate-day full-day kindergarten scored significantly higher than their counterparts in the half-day every-day classes in three of the standardized tests, reading, spelling (handwriting) and math.

3. After adjusting for differences in pretest scores, the children in the alternate-day full-day program still showed a statistically significant superiority to the half-day every-day sample in the tests of reading and math. The spelling (handwriting) subtest was no longer statistically significant.

4. As in 1984-85, the children in the alternate-day full-day model were superior to children in the half-day every-day program in all six tests related to language proficiency (vocabulary, spatial verbal, spatial motoric, following directions, answering questions, and analogies.) This was also true in the 1985-86 sample tested.

TABLE 3

COMPARING SCORES OF CHILDREN WHO ARE NOT POVERTY LEVEL ENROLLED IN HALF-DAY OR IN ALTERNATE-DAY KINDERGARTEN CLASSES 1985-86

| TEST/MODEL | N. | MEAN PRETEST | S.D. | PROB. | N. | MEAN POST-TEST | S.D. | PROB. | ADJUSTED PROB. |
|---|---|---|---|---|---|---|---|---|---|
| English Vocab. | | | | | | | | | |
| Half/day | 24 | 75.5 | 33.3 | 0.38 | 23 | 88.9 | 32.4 | 0.13 | 0.86 |
| Alt./day | 7 | 87.4 | 21.0 | | 17 | 100.0 | 10.0 | | |
| Reading | | | | | | | | | |
| Half/day | 24 | 92.5 | 12.6 | 0.72 | 23 | 95.0 | 14.3 | 0.27 | 0.34 |
| Alt./day | 7 | 90.6 | 13.2 | | 17 | 99.8 | 12.2 | | |
| Spelling | | | | | | | | | |
| Half/day | 24 | 85.3 | 17.7 | 0.12 | 23 | 95.3 | 13.3 | 0.42 | 0.78 |
| Alt./day | 7 | 73.9 | 12.6 | | 17 | 98.5 | 11.0 | | |
| Math | | | | | | | | | |
| Half/day | 24 | 86.2 | 14.6 | 0.59 | 23 | 88.5 | 23.4 | 0.46 | 0.57 |
| Alt./day | 7 | 89.4 | 11.0 | | 17 | 99.8 | 10.6 | | |
| CTBS Reading | | | | | | | | | |
| Half/day | 27 | 32.5 | 17.6 | 0.55 | | | | | |
| Alt./day | 17 | 35.5 | 12.3 | | | | | | |
| CTBS Math | | | | | | | | | |
| Half/day | 27 | 28.6 | 18.6 | 0.43 | | | | | |
| Alt./day | 17 | 32.6 | 12.9 | | | | | | |
| Colors | | | | | | | | | |
| Half/day | 22 | 17.2 | 9.1 | 0.71 | 23 | 20.2 | 7.3 | 0.38 | 0.99 |
| Alt./day | 7 | 15.7 | 8.4 | | 16 | 22.2 | 5.9 | | |
| Shapes | | | | | | | | | |
| Half/day | 22 | 9.1 | 5.5 | 0.62 | 23 | 12.7 | 7.6 | 0.45 | 0.89 |
| Alt./day | 7 | 7.9 | 6.5 | | 16 | 11.0 | 6.3 | | |
| Numbers | | | | | | | | | |
| Half/day | 22 | 22.9 | 18.3 | 0.58 | 23 | 36.1 | 21.2 | 0.26 | 0.80 |
| Alt./day | 7 | 18.6 | 16.5 | | 16 | 43.5 | 18.0 | | |
| Letters | | | | | | | | | |
| Half/day | 22 | 14.7 | 16.0 | 0.97 | 23 | 25.7 | 20.7 | 0.24 | 0.67 |
| Alt./day | 7 | 15.0 | 22.9 | | 16 | 33.4 | 18.0 | | |
| Quantities | | | | | | | | | |
| Half/day | 22 | 8.3 | 2.3 | 0.59 | 23 | 8.9 | 1.8 | 0.39 | 0.43 |
| Alt./day | 7 | 7.7 | 3.3 | | 16 | 9.3 | 1.1 | | |
| Spatial Verbal | | | | | | | | | |
| Half/day | 22 | 6.8 | 2.4 | 0.31 | 23 | 7.9 | 2.8 | 0.15 | 0.81 |
| Alt./day | 7 | 5.7 | 2.6 | | 16 | 8.9 | 1.4 | | |
| Spatial Motoric | | | | | | | | | |
| Half/day | 22 | 8.0 | 2.5 | 0.72 | 23 | 8.8 | 2.0 | 0.12 | 0.55 |
| Alt./day | 7 | 7.6 | 3.1 | | 16 | 9.7 | 0.8 | | |
| Following Directions | | | | | | | | | |
| Half/day | 22 | 6.3 | 2.0 | 0.31 | 23 | 8.0 | 1.8 | 0.10 | 0.28 |
| Alt./day | 7 | 5.3 | 2.6 | | 16 | 8.9 | 1.3 | | |
| Answering Questions | | | | | | | | | |
| Half/day | 22 | 7.8 | 2.4 | 0.97 | 23 | 9.6 | 1.1 | 0.14 | 0.97 |
| Alt./day | 7 | 7.9 | 3.2 | | 16 | 9.9 | 0.3 | | |
| Analogies | | | | | | | | | |
| Half/day | 22 | 10.9 | 3.5 | 0.09 | 23 | 13.4 | 2.5 | 0.74 | 0.52 |
| Alt./day | 7 | 18.1 | 19.2 | | 16 | 13.7 | 2.0 | | |

* = Statistically significant beyond .05 level.

To summarize the findings in Table 3 which reports comparisons based on children who are above the poverty level.

1. The mainstream, non poverty-level children in the sample showed no significant differences at the beginning of the program on any of the sixteen measures used.

2. At the end of the kindergarten year there was also no significant difference in their scores on fourteen tests for either the total sample, or in the adjusted probability calculated for just those who were given both pre and post tests.

3. This replicates the finding of the 1984-85 study that for the mainstream child, the difference in scheduling makes little or no difference in these two models.

## TO SUMMARIZE THE EVALUATION FINDINGS FOR BOTH YEARS

These two years comparing children who attend half-time on either a half-day every-day kindergarten model, or the full-day alternate-day model, shows that the scheduling makes relatively little difference to the total student population. The predominant finding in each year, when comparing the total group in each model, was that of "no significant difference" on any of the test measures used. This finding is in line with that of other studies comparing half-day every-day with half-day alternate-day kindergarten schedules as will be shown in the pages that follow.

When there are differences between the two models, the alternate-day full-day program is slightly favored. This may be because the total time in school is increased under an alternate-day schedule--an increase that can add up to five to seven weeks "extra" school time over a year.

For disadvantaged children (poor or minority) the alternate-day program in both years of this study produced greater gains. For non-disadvantaged children there appeared to be littl difference in the two schedules although the white children made greater gains in the half-day model in the 1984-85 study. The gains were not large enough to be statistically significant in either case, but the consistency established a slightly different pattern to findings in these comparisons.

Since the main increase in time in school under the alternate day model is in lunch time and in other informal learning situations rather than in actual class time, it may be that the learning that takes place in these informal settings is greater for the disadvantaged child since it provides more contrast to the home environment than would be the case for the children who come from more advantaged homes.

This finding also replicates that found in other studies (see pages which follow) in that studies which focused on a disadvantaged population showed the alternate-day program superior more often than studies which were based on a total school population without reference to SES or minority status factors.

## HOW DO THESE FINDINGS COMPARE TO OTHER STUDIES COMPARING HALF-DAY AND ALTERNATE-DAY FULL-DAY KINDERGARTENS?

FINDING: NINE OTHER STUDIES WERE FOUND DATING FROM 1972 TO 1984, COMPARING FULL-DAY ALTERNATE-DAY AND HALF-DAY KINDERGARTENS ON ONE OR MORE TESTS MEASURING COGNITIVE EFFECTS, IN TERMS OF DIFFERENCES STATISTICALLY SIGNIFICANT AT LEAST AT THE .05 LEVEL. STUDIES WHICH REPORTED ONLY ON OPINIONS OR HAD NO STATISTICAL ANALYSIS WERE ELIMINATED. A SUMMARY OF THESE STUDIES, TOGETHER WITH THE FINDINGS FROM THE TWO YEAR PASCO SCHOOL DISTRICT STUDY ARE SHOWN IN THE FIGURE BELOW.

| STATE & YR. STUDY WAS PUBLISHED | AUTHOR | CHARACTERISTICS OF THE SAMPLE | TESTS USED | TEST COMPARISONS TOTAL | SIGN. FOR HALF DAY | SIGN. FOR ALT. DAY | NO SIGN. DIFF. |
|---|---|---|---|---|---|---|---|
| Minn.<br>1972 | Moncada | 96 children from ten classes in six school dist. | Caldwell Preschool Inventory | 1 | 0 | 0 | 1 |
| | | | Local developed skills tests | 4 | 2 | 0 | 2 |
| Mich.<br>1977 | Gornovich, Volker & Landrey | 787 children<br>1971-73 Half-Day<br>1973-74 Alt.-Day | Metropolitan Readiness Test (1965)<br>Alt.-Day compared to each of 3 yrs. of ½ day | 21 | 1 | 15 | 5 |
| Ohio<br>1978 | Wanger* | 126 children in K | Walker Readiness Test (1976) | 1 | 0 | 0 | 1 |
| | | 116 children follow-up 1st Gr. | Metropolitan Readiness Test | 5 | 1 | 0 | 4 |
| Ohio<br>1979 | Cleminshaw | 96 children from four classes Lower Mid. Class | Met. Readiness Test (1965) | 7 | 0 | 6 | 1 |
| Ohio<br>1979 | Pigge, Smith | 201 children from 29 classes in 8 school districts | Met. Readiness Test (1965) | 7 | 3 | 0 | 4 |
| Minn.<br>1980 | Smith, C.L. | 257 children from 6 bldgs. HD from 1 school district AD from other SD | Met. Readiness Test (1976) | 5 | 0 | 3 | 2 |
| Minn.<br>1980 | Smith, C.L. | 86 children from 4 classes in 4th Grade follow-up | Iowa Test of Basic Skills | 5 | 0 | 0 | 5 |
| Colo.<br>1982 | Ulrey, Alexander, Bender & Gillis | 115 children from 2 rural school districts | (CAT) Calif. Ach. Test Pre-reading subtest | 1 | 0 | 0 | 1 |
| Wisc.<br>1984 | Slaney* | No. not given.<br>All K children in Lodi, Wisc.<br>1982-83 HD<br>1983-84 AD | Boehm Test of Basic Skills | 1 | 0 | 0 | 1 |
| | | | (TOBE) Test of Basic Experience | 4 | 0 | 0 | 4 |
| Wash.<br>1985 | McConnell | 38 Alt.-Day | Peabody Pict. Vocab. Test | 1 | 0 | 1 | 0 |
| | | 127 Half-Day | Wide Range Ach. Test | 3 | 0 | 0 | 3 |
| | | | 9 District Tests | 9 | 0 | 1 | 8 |
| Wash.<br>1986 | McConnell | 16 Alt.-Day | Peabody Pict. Vocab. Test | 1 | 0 | 0 | 1 |
| | | 55 Half-Day | Wide Range Ach. Test | 3 | 0 | 0 | 3 |
| | | | 10 District Tests | 10 | 0 | 0 | 10 |
| | | | TOTALS | 89 | 7<br>(8%) | 26<br>(29%) | 56<br>(63%) |

*A conservative approach was taken to the number of comparisons reported. Both Wenger and Slaney reported results from a matched sample and for a larger unmatched sample. Only the results of the matched sample were reported. Similarly, in other studies when results were reported separately by sex, etc., only the most inclusive comparisons were counted. In the McConnell studies, separate analyses for poor/non-poor was carried out, but only the more inclusive analysis for all students is reported.

## PART THREE

# EVALUATION OF THE ALL DAY KINDERGARTEN PROGRAM
# PASCO SCHOOL DISTRICT, STATE OF WASHINGTON
# FOR THE 1985-86 AND 1986-87 SCHOOL YEARS

Report prepared by:

Beverly B. McConnell, PhD.

External Evaluator

Research and Evaluation Office

SW 615 Cityview, Pullman, WA 99163

## EXECUTIVE SUMMARY

This is a report comparing the gains made by children in a full-day, every-day kindergarten program during 1985-86, and during 1986-87. A comparison group of kindergarten children was tested in kindergartens that met half day or full-day on alternate days. For this evaluation these two programs have been combined and called the half/day model, since both involve only half time services. This was the second and third year of a study of kindergarten schedules carried out by Pasco School District.

The primary findings for the 1985-86 comparative study were:

Children in the full-day program achieved significantly higher scores, after the adjustment for pretest differences, in seven of fourteen test instruments used. Their achievements were significantly higher in a nationally standardized test of reading, and spelling/handwriting skills. They also made significantly higher scores on five individual kindergarten skill tests involving colors, shapes, numbers, letters, and quantities.

There were no tests in which children in the half-day programs showed a statistically significant superiority.

Separate analysis comparing the test scores of poverty level children enrolled in the two programs found the children in the full-day program significantly ahead of their counterparts in a half-day program in five subject areas, including reading and four of the kindergarten skill tests.

The greatest gain made by poverty-level children was in English vocabulary. Since the full-day program served primarily limited English proficient children with a bilingual teacher and bilingual aide, this gain established the effectiveness of the program for increasing English skills.

Mainstream children selected to balance the classroom and serve as language models also did extremely well in the full-day kindergarten.

This group of children made their greatest gain in reading skills, in which their scores were significantly higher than children in the half-day models. They also had statistically significant superiority, even after the adjustment for pretest differences, in three other test areas.

In 1986-87 the study was limited to only four tests, and no new comparison group was tested, so the comparison group from 1985-86 was also used to make comparison of the gains achieved by full-day kindergarten children in 1986-87. The primary findings from this evaluation were:

Children in the full-day kindergarten were significantly ahead of children in the half-day models in all four subject areas tested: English vocabulary, Reading, Spelling/handwriting, and Math.

In the analysis limited to children of poverty-level in the two models, the children in the full-day model had lower pretest scores in English vocabulary, reading and math than children in the half-day model. After a year of full-day kindergarten their scores in reading and math were significantly higher than children in the half-day model. Their score in reading was above national norms for this age group.

The children selected as language models to balance the classroom had higher entry skills than the district norm as measured by the scores on the non-poverty group in the half-day model. They also made very large gains as a result of attending the full-day kindergarten, resulting in final scores far above national norms, achieving in what would be the top quartile of students nationally.

In summary, the full-day kindergarten is an extremely powerful intervention significantly raising the language proficiency and academic skills for all participating children.

## INTRODUCTION

Pasco School District has traditionally had half-day kindergarten programs. Funding from the state only covers one half FTE for children at the kindergarten level. For the school year 1984-85 the district introduced a full-day kindergarten program to serve children "at risk of school failure" because of lack of readiness skills related to conditions of poverty in the home, and children with limited English proficiency.

An earlier report has been issued on the 1984-85 evaluation of this program. To briefly summarize the findings, the end of the year tests used to compare children in the full-day and the half-day (or alternate-day) kindergarten models did not find significant superiority among children receiving the full-day every day program. These findings were considered questionable because the composition of the full-day classroom was so different from the composition of the half-day classrooms as to make doubtful the validity of any comparison. Over 80% of the children in the full-day classroom were from minority, poverty homes, whereas only 40% of the children in the half-day kindergarten samples were classified as "poverty level". In addition, a number of the non-minority, non-poor children in the full-day classroom were also put into the program because they had other special needs such as attention and behavior problems. This made for a concentration of children with special needs not at all matched by the half-day programs.

The full-day classroom also was served by a first year teacher. Although all observers felt she was an exceptionally capable teacher who did an outstanding job with her students, even she felt that the "full-day" model had not been given an adequate test because of the high concentration of children with special needs and because it was her first year of teaching.

In the first year evaluation (1984-85) no pretests were available for the comparison groups from the half-day and alternate-day kindergartens, so it was not possible to adjust post test scores on the basis of differences in their pretest scores. The scores on the CTBS given in the district to all children at several grade levels including kindergarten, was used as a "proxy" for pretests on the evaluation instruments, to determine the comparability of the children in the different kindergarten models on preacademic skills measured by this test.

A second year comparative evaluation was planned for the 1985-86 school year to correct some of the weaknesses that made interpretation of the first year findings difficult. More "mainsteam children" were selected for the full-day classroom to provide a mix with the poverty level, limited English proficient students, up from 19% to 31% of the class enrollment. (Even with this adjustment the balance of poverty/to non-poverty students was greater in the full-day program--69% poverty/31% non-poverty in the full-day program and 53% poverty/47% non-poverty in the half-day sample.) In 1985-86, the other children selected to provide balance in the class were average students rather than children with special needs. Also in 1985-86 the children in both the full-day kindergarten and the comparison classrooms were given pretests and posttests. Analysis of gains made an adjustment for differences in pretest performance levels.

The first year program evaluation in 1984-85 included extensive observation data from each of the three kindergarten models compared (full-day alternate-day and half-day). This was not repeated in the follow-up evaluation in 1985-86. Some of the key findings from this aspect of the first year evaluation were the following:

Observers, parents and teachers all found that the full-day did not produce an undue amount of fatigue. Children adjusted readily to a full day schedule.

No parts of the day were found to be non-productive learning periods. With appropriate alternation of quiet and active learning periods, children were able to function very well in either classroom model.

Parents of children enrolled in the different time models tended to state a preference for whichever model their child had experienced. When they selected a different schedule as a preference the difference was weighted in favor of schedules with more access to morning hours. Full-day every day or half-day morning classes were preferred over alternate-day programs, and half-day afternoon classes had the lowest approval from parents.

The full-day every day, and the alternate full-day schedules both produced more in-school time. The three schedules did not differ very greatly in the formally scheduled learning periods in academic subjects. The full-day schedule allowed vastly more language arts reinforcement activities, and informal learning time (interaction on the playgrounds or over lunch). The full-day everyday schedule, with a full-time aide, also allowed much greater individualization of instruction. It permitted intensive work with children who were either behind others and needed extra help, or ready to go ahead to new learning activities for which the majority of the class was not yet ready.

It is presumed that these findings would apply to the full-day program in 1985-86, evaluated here, and in 1986-87 when the full-day program was expanded to two classrooms. (Note in 1987-88 Pasco has started three full-day kindergarten groups). The extra funds required for a full-day kindergarten program come from a combination of federal and local district money.

## SOME NOTES ON THE ANALYSIS

Tests used The Peabody Picture Vocabulary Test was used to measure vocabulary in English. The Wide Range Achievement Test was used to measure readiness in three academic areas: Reading, Math and Spelling. The test called "spelling" is more of a measure of handwriting at this level, or eye-hand coordination as it required children to copy a series of marks of increasing difficulty and make letters of their name. Relatively few of the children tested were able to write out the words they were asked to spell.

The CTBS is the district standardized test. Fall testing is done and the kindergarten level test includes a score for "total reading" skills, and one for "math concepts". Taken as an additional pretest measure, it allowed the reader to evaluate how comparable the groups were on initial preacademic skills. In 1984-85 some people questioned whether there was any validity to a group administered, standardized test given to kindergarten children who had only been in school a few weeks. To respond to this concern, the evaluator did a correlation between kindergarten children's scores on the CTBS and first period report card data related to initial reading and math skills. This tended to validate the CTBS scores since there was a high correlation between the standardized test scores and the individually administered skill tests used by the kindergarten teachers.

All three of the above named tests are nationally standardized tests, with good stability in test scores and ample development information on validity and reliability. The other test used was the KESA, a district developed test with ten subtest areas which measured the types of preacademic skills that a kindergarten child might be expected to have. This instrument was used to supplement the nationally standardized tests because it allowed measurement of many skill areas more than those included in the standardized tests. This local test was thoroughly field tested during its development. It is relevant to the kindergarten "curriculum" in Pasco. It yields good reliability from one tester to another.

### Characteristics of the sample.

The comparison sample was drawn up by the evaluator. Ninety-one children were selected for the comparison group, out of which 60 were from half-day every day classes and 31 from alternate-day classes. Because children in half-day programs do not stay for lunch, no way was readily available to judge which children would qualify for free or reduced lunch. (This classification of children as eligible for free or reduced lunch was done a year later after they had entered first grade which required them to have lunch at school.) As it turned out the percentage eligible for free or reduced lunch was virtually equal in the half day and the alternate day samples, e.g. 32 out of 60 children in the half day programs, and 16 out of 31 children in the alternate day sample, i.e. 53% poverty students/ 47% non-poverty. The full-day class had 69% poverty students/ 31% non-poverty. Because of this, the analysis of scores based on the total class is somewhat weighted against the full-day model since it had a disproportionately large number of disadvantaged students.

In addition to the total group analysis, a separate analysis was made which compared only those children in the poverty-level group, and a separate analysis was also made comparing the non-poverty level children enrolled in the different kindergarten program models. This separate analysis answers the questions as to how the different kindergarten models affect the "at risk" children who are considered the primary target group. And it also shows shows the effects of a full-day program for the mainstream students who are not considered "at risk" students

The evaluator did not have anything to do with the selection of children for the full-day program. The "at risk" children were nearly all children of limited English proficiency who also happened to qualify as coming from poverty level homes. The "mainstream" students selected to balance out the classroom appear to be students of above average ability, based on entry level skills somewhat higher than the district average. Care was taken not to recruit children with special needs related to social and emotional development.

Method of analysis.

For this report, the children attending half-time in either half-day classrooms, or alternate full day classrooms, are combined as representing a "half day" program. (A separate analysis was made comparing children in the half-day and the alternate day classes which is reported in a separate evaluation.) The mean test scores were obtained at the beginning and the end of the kindergarten years for the two sample groups, and statistical tests were used to determine if either the pretest scores or the post test scores were statistically significant. Then an additional analysis was done which compared the gains made for the two groups, with an adjustment made for differences in pretest scores. This yielded an "adjusted probability" which indicated whether differences in final test performance were great enough to be statistically significant after an adjustment had been made to discount differences in the two groups at the beginning of the school year.

Since this evaluation is written for the general reader, who may not be too familiar with statistical procedures, it will be explained that a finding of "statistically significant difference" means that the probability of this much difference occuring "by chance" is less than 5 in 100, written as prob. = 0.05. Anything lower than 0.05 increases the "weight" of the finding, i.e. a probability of 0.01 or less means that the differences are even greater between the groups, and the possiblity of chance occurence reduced to less than one in 100. Similarly the probability of chance differences increases the more similar the two groups are found to be. It is customary in educational research to declare something "statistically significant" when the probability that the difference might occur by chance is less than 0.05.

The "adjusted probability" reported uses a statistical procedure which "adjusts" the final scores to discount any differences that children had at the beginning of the treatment, and reports whether the difference that resulted from the treatment alone is enough to be considered "statistically significant."

There are some differences in the number of children in the analysis in the fall and in the spring. More children were given spring tests than were given pretests. In addition, one or two of the subtests for a child might be considered invalid, and some children moved away. The evaluator used all valid tests for analysis, which means that in the summary statistics the number of children tested differs slightly from one test to another, and from one test period to another. However, the statistical procedure used to obtain the final "adjusted" significance of difference between scores reduces this final analysis to only those children for whom there are pairs of scores available.

In 1986-87 the number of children increased as two full-day kindergarten classrooms were set up. (Note in 1987-88 three classrooms were set up to serve children in full-day programs). No further comparison group testing was done, so the analysis for that group of children uses the same comparison group tested during the 1985-86 year. Similarly the evaluation was scaled back in 1986-87 by limiting testing to the two standardized tests (yielding only four subtest scores.) The KESA (10 subtests) and the CTBS scores (two subtests) were not available for the evaluation of the 1986-87 program.

Standard scores are reported for the three standardized tests. The Vocabulary test and the Wide Range Achievement Test, reading, math, and spelling subtests are reported as standard scores with a mean of 100 and a standard deviation of 15. This means that a score of 100 on this score would represent the national "average" svore for that age. The CTBS scores in reading and math are reported as NCE scores. This uses a mean of 50 and a standard deviation of 21. On this test a score of 50 would represent the "national average" for that test.

The use of standard scores eliminates the differences that would be brought about simply by maturity. Since all children are expected to learn something from just getting older, it means that a higher "raw score" must be achieved to keep the same standard score at a higher age level. By discounting the effects of simple "maturity" the use of standard scores is a more accurate measurement for statistical purposes. The local test (ten subtests of the KESA) does not have "norms" drawn from a larger sample, so the scores reported are raw scores representing the number of correct responses to test items.

## FINDINGS

The table below summarizes test scores of all children for 85-86.

### TABLE 1

### COMPARISON OF SCORES OF CHILDREN IN FULL DAY AND IN HALF DAY KINDERGARTEN

Analysis includes all children in sample.

| TEST/MODEL | N. | MEAN PRETEST | PROB. | N. | MEAN POSTTEST | PROB. | ADJUSTED PROB. |
|---|---|---|---|---|---|---|---|
| Eng. Vocab | | | | | | | |
| Half/day | 71 | 76.4 | 0.989 | 85 | 90.8 | 0.573 | 0.163 |
| Full/day | 26 | 76.5 | | 24 | 93.5 | | |
| Reading | | | | | | | |
| Half/day | 71 | 91.0 | 0.210 | 85 | 96.4 | 0.000 * | 0.000 * |
| Full/day | 26 | 94.2 | | 24 | 110.1 | | |
| Spelling | | | | | | | |
| Half/day | 71 | 82.2 | 0.061 | 85 | 94.9 | 0.061 * | 0.006 * |
| Full/day | 26 | 88.7 | | 24 | 104.1 | | |
| Math | | | | | | | |
| Half/day | 71 | 88.8 | 0.096 | 85 | 95.9 | 0.041 * | 0.098 |
| Full/day | 26 | 94.1 | | 24 | 104.2 | | |
| CTBS Reading | | | | | | | |
| Half/day | 91 | 33.9 | 0.695 | 85 | | | |
| Full/day | 26 | 37.3 | | 14 | | | |
| CTBS Math | | | | | | | |
| Half/day | 91 | 34.3 | 0.607 | 85 | | | |
| Full/day | 26 | 37.3 | | 24 | | | |
| Colors | | | | | | | |
| Half/day | 65 | 17.7 | 0.589 | 84 | 21.5 | 0.013 * | 0.000 * |
| Full/day | 26 | 16.7 | | 24 | 25.0 | | |
| Shapes | | | | | | | |
| Half/day | 65 | 8.8 | 0.040 * | 84 | 12.1 | 0.001 * | 0.034 * |
| Full/day | 26 | 11.3 | | 24 | 16.8 | | |
| Numbers | | | | | | | |
| Half/day | 65 | 23.4 | 0.762 | 84 | 38.9 | 0.001 * | 0.000 * |
| Full/day | 26 | 24.6 | | 24 | 51.9 | | |
| Letters | | | | | | | |
| Half/day | 65 | 12.7 | 0.279 | 84 | 26.8 | 0.000 * | 0.000 * |
| Full/day | 26 | 16.6 | | 24 | 44.3 | | |
| Quantities | | | | | | | |
| Half/day | 65 | 8.4 | 0.384 | 84 | 9.1 | 0.056 * | 0.038 * |
| Full/dday | 26 | 8.8 | | 24 | 9.8 | | |
| Spatial Verbal | | | | | | | |
| Half/day | 65 | 6.5 | 0.537 | 84 | 8.1 | 0.790 | 0.097 |
| Full/day | 26 | 6.1 | | 24 | 8.3 | | |
| Spatial Motoric | | | | | | | |
| Half/day | 65 | 8.0 | 0.384 | 84 | 9.1 | 0.830 | 0.134 |
| Full/day | 26 | 7.5 | | 24 | 9.2 | | |
| Following Directions | | | | | | | |
| Half/day | 65 | 6.0 | 0.363 | 84 | 8.2 | 0.880 | 0.960 |
| Full/day | 26 | 6.5 | | 24 | 8.3 | | |
| Answering Questions | | | | | | | |
| Half/day | 65 | 7.7 | 0.363 | 84 | 9.3 | 0.564 | 0.829 |
| Full/day | 26 | 8.0 | | 24 | 9.2 | | |
| Analogies | | | | | | | |
| Half/day | 65 | 11.3 | 0.609 | 84 | 13.1 | 0.831 | 0.419 |
| Full/day | 26 | 10.7 | | 24 | 13.2 | | |

* = Statistically significant beyond .05 level

Summary of findings from Table 1.

1. The groups were essentially alike at the beginning of the program. Scanning down the pretest scores, there is only one out of sixteen tests in which the differences between the groups was enough to be statistically significant, the subtest on naming shapes.

2. At the beginning of the year children in the full-day kindergarten scored higher in 11 out of sixteen tests. Children in the half-day programs scored higher in 5 out of sixteen tests.

3. At the end of the kindergarten year, children in the full-day kindergarten scored highest in 13 out of 14 tests.

4. In math, the posttest scores of full-day children was significantly greater than for half-day children, but when the difference in pretest scores was taken into account, the difference was no longer great enough to be statistically significant at the .05 level.

5. In all other subject areas, the magnitude of gains made by children in the full-day program was great enough that the difference remained statistically significant even after adjusting for differences in pretest scores.

6. The subject areas in which full-day kindergarten children showed a significant superiority to children receiving only a half-day program are the following:

   Reading

   Spelling/handwriting

   Naming of colors

   Naming of shapes

   Identifying numerals

   Naming letters

   Identifying quantities

7. In two additional tests, the differences between groups on the final test was near the level of significance, i.e. the math test and the "spatial verbal"test (telling if an object is 'on' 'beside' etc.)

8. Both groups showed an "educationally significant" gain in English vocabulary--approximately 15 points gain which represents one full standard deviation improvement on this test. This far exceeds the standard of "one-third of a standard deviation" which the U.S. Office uses as a rule of thumb measure of when a gain in standard scores is "educationally significant". This indicates that the kindergarten program in Pasco is a very powerful one for improving children's language proficiency. Since both programs made such a large gain, there was no significant difference found between the two program models.

9. The most impressive gain in the full-day kindergarten was in reading skills. The gain made exceeds one full standard deviation, and the final score is in the top 25th percentile by national norms.

Table 2 below shows the effects of the program separately for those children classied as poor by their eligibility for free/reduced lunches.

## TABLE 2

### COMPARISON OF SCORES OF CHILDREN IN FULL DAY AND IN HALF DAY KINDERTENS ANALYSIS FOR POVERTY LEVEL CHILDREN ONLY - 1985-86 SCHOOL YEAR

| TEST/MODEL | N. | PRETEST MEAN | PROB | N. | POSTTEST MEAN | PROB | ADJUSTED PROB. |
|---|---|---|---|---|---|---|---|
| English Vocab. | | | | | | | |
| Half/day | 41 | 76.4 | 0.989 | 46 | 90.8 | 0.573 | 0.163 |
| Full/day | 18 | 76.5 | | 16 | 93.5 | | |
| Reading | | | | | | | |
| Half/day | 41 | 89.7 | 0.707 | 46 | 95.3 | 0.001 * | 0.000 * |
| Full/day | 18 | 90.8 | | 16 | 107.8 | | |
| Spelling | | | | | | | |
| Half/day | 41 | 81.2 | 0.063 | 46 | 92.8 | 0.032 * | 0.097 |
| Full/day | 18 | 88.9 | | 16 | 101.6 | | |
| Math | | | | | | | |
| Half/day | 41 | 89.8 | 0.962 | 46 | 97.5 | 0.238 | 0.145 |
| Full/day | 18 | 89.9 | | 16 | 101.3 | | |
| CTBS Reading | | | | | | | |
| Half/day | 48 | 33.3 | 0.194 | | | | |
| Full/day | 18 | 27.1 | | | | | |
| CTBS Math | | | | | | | |
| Half/day | 48 | 37.3 | 0.388 | | | | |
| Full/day | 18 | 30.7 | | | | | |
| Colors | | | | | | | |
| Half/day | 37 | 17.8 | 0.974 | 84 | 21.5 | 0.120 | 0.001 * |
| Full/day | 18 | 14.6 | | 24 | 24.3 | | |
| Shapes | | | | | | | |
| Half/day | 37 | 8.6 | 0.298 | 84 | 11.9 | 0.023 * | 0.068 |
| Full/day | 18 | 10.4 | | 24 | 15.8 | | |
| Numbers | | | | | | | |
| Half/day | 37 | 24.0 | 0.380 | 84 | 37.8 | 0.009 * | 0.000 * |
| Full/day | 18 | 19.2 | | 24 | 49.7 | | |
| Letters | | | | | | | |
| Half/day | 37 | 10.8 | 0.768 | 84 | 24.4 | 0.001 * | 0.000 * |
| Full/day | 18 | 12.1 | | 24 | 40.6 | | |
| Quantities | | | | | | | |
| Half/day | 37 | 8.5 | 0.862 | 84 | 9.1 | 0.035 * | 0.075 |
| Full/day | 18 | 8.4 | | 24 | 9.8 | | |
| Spatial Verbal | | | | | | | |
| Half/day | 37 | 6.3 | 0.111 | 84 | 7.8 | 0.719 | 0.023 |
| Full/day | 18 | 5.2 | | 24 | 7.6 | | |
| Spatial Motoric | | | | | | | |
| Half/day | 37 | 7.9 | 0.074 | 84 | 8.9 | 0.766 | 0.197 |
| Full/day | 18 | 6.7 | | 24 | 8.8 | | |
| Following Directions | | | | | | | |
| Half/day | 37 | 6.0 | 0.566 | 84 | 8.1 | 0.345 | 0.453 |
| Full/day | 18 | 5.7 | | 24 | 7.6 | | |
| Amswering Questions | | | | | | | |
| Half/day | 37 | 7.6 | 0.644 | 84 | 9.0 | 0.512 | 0.986 |
| Full/day | 18 | 7.3 | | 24 | 8.8 | | |
| Analogies | | | | | | | |
| Half/day | 37 | 10.1 | 0.611 | 84 | 12.6 | 0.850 | 0.557 |
| Full/day | 18 | 9.7 | | 24 | 12.4 | | |

To summarize the findings from Table 2:

1. The poverty level children in the full-day and half-day programs were very similar in initial ability. Scanning down the pretest scores there is not one in which the difference between the groups was large enough to be statistically significant.

2. The level of entry skills for the two groups was mixed. Children in the half-day programs were superior in five of the tests, and children in the full-day program superior in 11 of the sixteen.

3. At the end of the year children in the full-day kindergarten were significantly superior to those receiving the half-day program in five subject areas, and near the level of statistical significance in two others (adjusted probability less than 0.10).

4. There were no subjects in which children in the half-day program showed a statistically significant superiority.

5. Test areas in which the poverty level children tested significantly ahead of the half-day program children after an adjustment was made for differences in pretest scores, are listed below:

   Reading

   Naming of colors

   Identifying different numerals

   Naming of letters

   Spatial verbal

   Four other test areas were very near the level of statistical significance--(probability of this much difference by chance less than 0.10)

   English vocabulary

   Spelling/handwriting

   Naming of shapes

   Identifying quantities

   There were no areas in which the superiority of children in the half-day program was even close to statistical significance.

6. The test area where poverty level children showed the greatest increase was in English vocabulary, where children in the full-day program increased their average score by 23 points--the equivalent of one and a half standard deviations. Children in the half-day programs also increased 13 points--an educationally significant gain.

7. The final test score was above national norms for poverty children after a year in the full-day kindergarten in reading, math and spelling/handwriting skills.

Table 3 below shows the effects of the two models on non-poverty level children enrolled.

### TABLE 3

### COMPARISON OF FULL-DAY AND HALF-DAY KINDERGARTEN CHILDREN IN 85-86
### ONLY THOSE CHILDREN CLASSIFIED AS NON-POVERTY LEVEL

| TEST/MODEL | N. | PRETEST MEAN | PROB | N. | POSTTEST MEAN | PROB | ADJUSTED PROB. |
|---|---|---|---|---|---|---|---|
| English Vocabulary | | | | | | | |
| Half/day | 31 | 78.2 | 0.025 | 40 | 93.6 | 0.161 | 0.403 |
| Full/day | 8 | 105.1 | | 8 | 107.5 | | |
| Reading | | | | | | | |
| Half/day | 31 | 92.1 | 0.046 | 40 | 97.1 | 0.002 * | 0.011 * |
| Full/day | 8 | 102.0 | | 8 | 114.8 | | |
| Spelling | | | | | | | |
| Half/day | 31 | 88.7 | 0.405 | 40 | 96.6 | 0.017 * | 0.017 * |
| Full/day | 8 | 88.3 | | 8 | 109.1 | | |
| Math | | | | | | | |
| Half/day | 31 | 86.9 | 0.003 * | 41 | 93.2 | 0.080 | 0.620 |
| Full/day | 8 | 103.5 | | 8 | 107.0 | | |
| CTBS Reading | | | | | | | |
| Half/day | 44 | 33.7 | 0.011 * | | | | |
| Full/day | 8 | 43.6 | | | | | |
| CTBS Math | | | | | | | |
| Half/day | 44 | 30.1 | 0.002 * | | | | |
| Full/day | 8 | 52.3 | | | | | |
| Colors | | | | | | | |
| Half/day | 29 | 16.9 | 0.208 | 39 | 21.0 | 0.039 * | 0.054 * |
| Full/day | 8 | 21.3 | | 8 | 26.4 | | |
| Shapes | | | | | | | |
| Half/day | 19 | 8.8 | 0.044 * | 39 | 12.1 | 0.013 * | 0.350 |
| Full/day | 8 | 13.5 | | 8 | 18.6 | | |
| Numbers | | | | | | | |
| Half/day | 19 | 21.9 | 0.037 * | 39 | 39.1 | 0.027 * | 0.203 |
| Full/day | 8 | 35.6 | | 8 | 56.1 | | |
| Letters | | | | | | | |
| Half/day | 19 | 13.8 | 0.085 | 39 | 28.9 | 0.003 * | 0.004 * |
| Full/day | 8 | 26.6 | | 8 | 51.5 | | |
| Quantities | | | | | | | |
| Half/day | 19 | 8.2 | 0.003 * | 39 | 9.1 | 0.025 * | 0.739 |
| Full/day | 8 | 9.8 | | 8 | 9.8 | | |
| Spatial Verbal | | | | | | | |
| Half/day | 19 | 6.6 | 0.105 | 39 | 8.3 | 0.032 * | 0.239 |
| Full/day | 8 | 8.1 | | 8 | 9.5 | | |
| Spatial Motoric | | | | | | | |
| Half/day | 19 | 7.9 | 0.010 * | 39 | 9.2 | 0.024 * | 0.608 |
| Full/day | 8 | 9.5 | | 8 | 9.9 | | |
| Following Directions | | | | | | | |
| Half/day | 19 | 6.0 | 0.009 * | 39 | 8.3 | 0.000 * | 0.137 |
| Full/day | 8 | 8.3 | | 8 | 9.8 | | |
| Answering Questions | | | | | | | |
| Half/day | 19 | 7.8 | 0.114 | 39 | 9.7 | 0.377 | 0.986 |
| Full/day | 8 | 9.4 | | 8 | 10.0 | | |
| Analogies | | | | | | | |
| Half/day | 19 | 12.7 | 0.874 | 39 | 13.5 | 0.110 | 0.338 |
| Full/day | 8 | 13.0 | | 8 | 14.9 | | |

* - Statistically significant at the .05 level

To summarize the findings from Table 3.

1. The non-poverty level students selected for the full-day kindergarten program in 85-86 had higher entry skills than their counterparts in the half-day program. Their entry scores were higher in 15 out of the sixteen tests used; enough higher to be statistically significant in ten of these tests, and near significance in two others.

2. At the end of kindergarten, the mainstream children in the full-day kindergarten had increased their superiority in all subject areas over the scores on children in half-day kindergarten, and even after final test scores were adjusted for differences in pretests, their superiority was large enough to be statistically significant in four test areas, as listed below:

   Reading

   Spelling/Handwriting

   Naming of Colors

   Naming of letters

3. The most outstanding gain made by non-poor children in the full-day classroom was in reading. They increased their reading score during the year by 13 points, compared to a gain for children in the half day kindergarten of 5 points. The final score in reading for the non-poor children in the full-day kindergarten was 114.8, nearly 115 which would be in the top 15% of children in the national sample.

Table 4 on the next page presents the findings from the third year evaluation of the full-day kindergarten program. Because there were only four tests used in this evaluation, all three analysis are included in the same table. This includes the analysis for all children in the program, and a separate analysis for poor children, and non-poor children.

Because no comparison children were tested in 1986-87, the comparison group reported on this table is the same comparison group tested in 1985-86. This enables the reader to compare successive years of full-day kindergarten children in relationship to the achievement of children in a half-day program.

TABLE 4 below gives the results of testing for full-day childrn in the 1986-87 school year, and half-day children tested in the 1985-86 school year. The ratio of poor to non-poor children was 30 poor, 15 non-poor during 1986-87 school year. There were two full-day kindergarten classes.

### TABLE 4

### COMPARISON OF CHILDREN IN THE FULL-DAY AND HALF-DAY KINDERGARTENS

ANALYSIS OF ALL CHILDREN - 1986-87 SCHOOL YEAR:

| TEST/MODEL | N. | PRETEST MEAN | PROB. | N | POSTTEST MEAN | PROB. | ADJUSTED MEAN |
|---|---|---|---|---|---|---|---|
| English Vocabulary | | | | | | | |
| Half/day | 72 | 75.6 | 0.986 | 86 | 89.9 | 0.065 | 0.016 * |
| Full/day | 45 | 75.7 | | 37 | 97.9 | | |
| Reading | | | | | | | |
| Half/day | 72 | 90.7 | 0.820 | 86 | 96.1 | 0.001 * | 0.000 * |
| Full/day | 43 | 91.4 | | 37 | 106.9 | | |
| Spelling | | | | | | | |
| Half/day | 72 | 81.8 | 0.001 * | 86 | 94.6 | 0.033 * | 0.033 * |
| Full/day | 43 | 92.5 | | 37 | 100.6 | | |
| Math | | | | | | | |
| Half/day | 72 | 88.5 | 0.293 | 86 | 95.5 | 0.005 * | 0.000 * |
| Full/day | 43 | 91.8 | | 37 | 105.1 | | |
| ANALYSIS OF POOR CHILDREN ONLY: | | | | | | | |
| English Vocabulary | | | | | | | |
| Half/day | 41 | 73.7 | 0.154 | 46 | 86.6 | 0.900 | 0.163 |
| Full/day | 30 | 64.5 | | 24 | 87.2 | | |
| Reading | | | | | | | |
| Half/day | 41 | 89.7 | 0.064 | 46 | 95.3 | 0.063 | 0.000 * |
| Full/day | 29 | 83.4 | | 24 | 101.5 | | |
| Spelling | | | | | | | |
| Half/day | 41 | 81.1 | 0.027 * | 46 | 92.8 | 0.396 | 0.209 |
| Full/day | 29 | 89.3 | | 24 | 95.8 | | |
| Math | | | | | | | |
| Half/day | 41 | 89.8 | 0.172 | 46 | 97.5 | 0.867 | 0.000 * |
| Full/day | 29 | 85.1 | | 24 | 98.3 | | |
| ANALYSIS OF NON-POOR CHILDREN ONLY: | | | | | | | |
| English Vocabulary | | | | | | | |
| Half/day | 31 | 67.2 | 0.003 * | 40 | 93.6 | 0.003 * | 0.194 |
| Full/day | 15 | 98.2 | | 13 | 117.7 | | |
| Reading | | | | | | | |
| Half/day | 31 | 92.1 | 0.000 * | 40 | 97.1 | 0.000 * | 0.078 |
| Full/day | 14 | 107.9 | | 13 | 116.8 | | |
| Spelling | | | | | | | |
| Half/day | 31 | 82.7 | 0.004 * | 40 | 96.6 | 0.004 * | 0.050 * |
| Full/day | 14 | 98.9 | | 13 | 109.3 | | |
| Math | | | | | | | |
| Half/day | 31 | 86.9 | 0.000 * | 41 | 93.2 | 0.000 * | 0.261 |
| Full/day | 114 | 105.6 | | 13 | 117.5 | | |

* = STATISTICALLY SIGNIFICANT BEYOND THE 0.05 LEVEL.

Summary of findings from Table 4:

1. The 'at risk' poverty level children entering the full-day kindergarten had very low entry level skills, in all cases comparable to the lowest quartile compared to national norms, and in every subject except handwriting (spelling) below the entry skills of poor children entering the half-day classrooms.

2. The non-poor children selected for the all-day kindergarten had entry skills significantly above the district average, as represented by the entry skills of non-poor children enrolling the half-day kindergartens. In reading and math, these entry skills were also above national norms (represented by a standard score of 100).

3. Both groups of children benefitted from the full-day kindergarten, with the result that at the end of the kindergarten year, even after adjusting for differences in pretest performance, children in the full-day program were significantly ahead of children who attended half-day kindergartens in all four subject areas tested:

   ENGLISH VOCABULARY

   READING

   SPELLING/HANDWRITING

   MATH

4. Poverty level children in the full-day class, who had entry skills lower than that of poverty level children in the half-day programs in three out of four tests, ended up with scores higher than those of children in the half-day program in all areas tested. Their final score in reading was above national norms.

5. Non-poor children in the full-day kindergarten made greater gains from pre to post test than children in the half-day kindergarten in English vocabulary, reading and math.

## TO SUMMARIZE THE EVALUATION FINDINGS FOR BOTH YEARS

The replication of results in 1986-87 to those in 1985-86 indicates that the impact of a full-day kindergarten program is very great for all children served. The children entering the full-day kindergarten program with the lowest level of entry skills were able to achieve readiness skills almost at national norms by the end of the kindergarten year. Children enrolling with superior readiness skills were able to take advantage of the individual attention possible with a full-time aide, and to continue their development to a level that would warrant the label of "gifted and talented" by the end of a year of full-time kindergarten. Children in the half-day programs showed educationally significant gains as well, but much less gain than was made by children in the full-day program.

# HOW DO THESE FINDINGS COMPARE TO OTHER STUDIES COMPARING HALF-DAY AND FULL-DAY EVERY-DAY KINDERGARTEN ON COGNITIVE LEARNING TESTS?

FINDINGS: THE TABLE BELOW SHOWS THE FINDINGS FROM ELEVEN STUDIES WHICH COMPARED COGNITIVE EFFECTS OF KINDERGARTEN BY CHILDREN ATTENDING HALF-DAY OR FULL-DAY EVERY-DAY.

| STATE & YR STUDY WAS PUBLISHED | AUTHOR | CHARACTERISTICS OF THE SAMPLE | TESTS USED | TEST COMPARISONS TOTAL | SIGN. FOR HALF DAYS | SIGN. FOR FULL-DAY EVERY-DAY | NO SIGN. DIFF. |
|---|---|---|---|---|---|---|---|
| Missouri 1970 | Winter & Klein | Low skills & immature 7 HD 6 FDED | Metropolitan Readiness Test (1965) | 7 | 0 | 5 | 2 |
| | | | Stanford Achievement Test | 5 | 0 | 0 | 5 |
| | | Middle SES Ed. Advantages 29 HD 26 FDED | Metropolitan Readiness Test (1965) | 7 | 0 | 0 | 7 |
| | | | Stanford Achievement Test | 5 | 0 | 0 | 5 |
| Texas 1976 | Lysiak & Irwin | Middle SES 123 HD 108 FDED | Metropolitan Readiness Test Comp. Score | 1 | 0 | 0 | 1 |
| | | High SES 138 HD 117 FDED | Metropolitan Readiness Test Comp. Score | 1 | 0 | 1 | 0 |
| Texas 1978 | Hatcher | 110 children from 26 classes half Anglo, half Mex.-American | Metropolitan Readiness Test Comp. Score | 1 | 0 | 0 | 1 |
| Indiana 1980 | Humphrey | 78-79 179 FDED, 217 HD | California Achievement Test | 10 | 0 | 10 | 0 |
| | | 79-80 229 FDED, 199 HD | California Achievement Test | 10 | 0 | 9 | 1 |
| Colorado 1981 | McClinton & Topping | 8 FDED classes<br>8 HD classes | Comprehensive Test of Basic Skills Battery | 1 | 0 | 0 | 1 |
| Ohio 1981 | Nieman & Gastright | 551 children | Boehm Test of Basic Concepts, | 4 | 0 | 4 | 0 |
| | | | Metropolitan Readiness Test Comp. Score | 1 | 0 | 1 | 0 |
| Iowa 1980 | Ziomek & Harris | 303 FDED 178 HD 79-80 | Metropolitan Readiness Test (1978) | 5 | 0 | 4 | 1 |
| Iowa 1982 | Ziomek | 80-81 Approx. same as in 79-80 | Metropolitan Readiness Test (1978) | 5 | 0 | 5 | 0 |
| Louisiana 1984 | Gullo, Bersani & Clements | 82 FDED/12 classes<br>55 HD/8 classes | Metropolital Readiness Test Comp. Score | 1 | 0 | 1 | 0 |
| Washington 1985 | McConnell | 18 FDED/1 class<br>127 HD/10 classes | Peabody Pict. Vocab. Test | 1 | 0 | 0 | 1 |
| | | | Wide Range Ach. Test 3 subtests | 3 | 0 | 0 | 3 |
| | | | 9 District Tests | 9 | 0 | 0 | 9 |
| Washington 1986 | McConnell | 26 FDED/1 class<br>71 HD/10 classes | Peabody Pict. Vocab. Test | 1 | 0 | 0 | 1 |
| | | | Wide Range Ach. Test 3 subtests | 3 | 0 | 2 | 1 |
| | | | 10 District Tests | 10 | 0 | 5 | 5 |
| Washington 1987 | McConnell | 45 FDED/2 classes<br>72 HD/12 classes | Peabody Pict. Vocab. Test | 1 | 0 | 1 | 0 |
| | | | Wide Range Ach. Test - 3 subtests | 3 | 0 | 3 | 0 |
| | | | T O T A L S | 95 | 0<br>(0%) | 51<br>(54%) | 44<br>(46%) |

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*If results were reported separately by sex, race, etc., only the most inclusive comparisons were counted.

CONCLUSION: THESE STUDIES ARE VERY CLEAR IN SHOWING A STRONG ADVANTAGE FOR CHILDREN ATTENDING A FULL-DAY EVERY-DAY PROGRAM. IN NO STUDY DID THE HALF-DAY CHILDREN EXCELL ON ANY TEST.

IN 54% OF THE COMPARISONS, THE SUPERIORITY OF CHILDREN IN THE FULL-DAY EVERY-DAY PROGRAM WAS LARGE ENOUGH AND CONSISTENT ENOUGH TO BE STATISTICALLY SIGNIFICANT.

## WHAT HAVE OTHER STUDIES FOUND COMPARING HALF-DAY AND FULL-DAY ALTERNATE-DAY PROGRAMS ON SOCIAL, EMOTIONAL GROWTH?

FINDINGS: FIVE STUDIES WERE FOUND WHICH USED TESTS OF SOCIOEMOTIONAL DEVELOPMENT, REPORTED IN TERMS OF WHETHER OBSERVED DIFFERENCES WERE STATISTICALLY SIGNIFICANT. THESE ARE SUMMARIZED IN THE FIGURE BELOW.

| STATE AND YEAR STUDY WAS PUBLISHED | AUTHOR | INSTRUMENT USED | NUMBER OF COMPARISONS | | | |
|---|---|---|---|---|---|---|
| | | | TOTAL | Sig. for HDED | Sig. for FDAD | No Sig. Differences* |
| Ohio 1979 | Pigge & Smith | Sentiment toward school & two measures of isolation from a sociogram | 3 | 0 | 0 | 3 |
| Ohio 1979 | Cleminshaw | Animal Crackers test of motivation. | 1 | 0 | 0 | 1 |
| | | Kohn Social Competency Scale (2 ratings) | 2 | 0 | 1 | 1 |
| Minn. 1980 | Smith, C.L. | Self-Observation Scale (self-acceptance, social maturity, school affiliation, self-security) | 4 | 0 | 2 | 2 |
| Minn. 1980 | Smith, C.L. | Self-Observation Scale (all of the above, plus social confidence, teacher & peer affiliation | 7 | 0 | 0 | 7 |
| Colo. 1982 | Ulrey | Connor's Hyper-activity Scale | 1 | 1 | 0 | 0 |
| | | | 18 | 1<br>(5%) | 3<br>(17%) | 14<br>(78%) |

**Any comparison in which the probability of chance occurence was greater than .05 was considered not statistically significant.*

**CONCLUSION: THESE AGGREGATED FINDINGS REVEAL NO DIFFERENCES IN SOCIO-EMOTIONAL DEVELOPMENT BETWEEN HALF-DAY AND FULL-DAY ALTERNATE-DAY SCHEDULES FOR KINDERGARTEN.**

HAVE STUDIES SHOWN THAT THE ADVANTAGE GAINED THROUGH FULL-DAY EVERY-DAY KINDERGARTEN IS MAINTAINED IN HIGHER GRADES?

FINDINGS: FOUR FOLLOW-UP STUDIES WERE FOUND COMPARING CHILDREN FROM HALF-DAY AND FROM FULL-DAY EVERY-DAY KINDERGARTENS TO THE END OF FIRST GRADE, FOURTH GRADE AND EIGHTH GRADE. THESE ARE SUMMARIZED BELOW.

FOLLOW-UP STUDIES OF FULL-DAY EVERY-DAY, HALF DAY KINDERGARTEN COMPARISONS

| STATE & YR STUDY WAS PUBLISHED | AUTHOR | CHARACTERISTICS OF THE SAMPLE | TESTS USED | TEST COMPARISONS TOTAL | SIGN. FOR HALF DAY | SIGN. FOR FULL-DAY EVERY-DAY | NO SIGN. DIFF. |
|---|---|---|---|---|---|---|---|
| MISSOURI 1970 | WINTER & KLEIN | END OF FIRST GRADE<br>13 Disadvantaged ch. | Stanford Ach. Test | 7 | 0 | 5 | 2 |
| | | 33 Advantaged Ch.<br>19 FDED, 14 HD | Stanford Ach. Test | 6 | 0 | 5 | 1 |
| INDIANA 1980 | HUMPHREY | FIRST GRADE FOR 78-79 K. students | Gates Mac-Ginitie Reading Test | 3 | 0 | 3 | 0 |
| INDIANA 1983 | HUMPHREY 2 | End of Second for 78-79 Students | Comp. Test of Basic Skills | 14 | 0 | 10 | 4 |
| | | 164 children | Gates MacGinitie Reading Test | 2 | 0 | 2 | 0 |
| | | End of First for 209 79-80 K. students | Gates MacGinitie Reading Tests | 2 | 0 | 2 | 0 |
| OHIO 1981 | NIEMAN & GASTRIGHT | 366 ch. at 4th grade | Metropolitan Ach. Test | 2 | 0 | 2 | 0 |
| | | 276 ch. at 8th grade | Metropolitan Ach. Test | 2 | 0 | 2 | 0 |
| | | | T O T A L S | 38 | 0<br>(0%) | 31<br>(82%) | 7<br>(18%) |

CONCLUSION: THE SUPERIORITY OF CHILDREN ACQUIRED THROUGH THE FULL-DAY EVERY-DAY KINDERGARTEN HAS BEEN FOUND TO CARRY THROUGH THEIR SCHOOLING IN FOLLOW-UP STUDIES AS FAR AS THE EIGHTH GRADE.

# PART FOUR

## EARLY CHILD EDUCATION PROGRAM
## SHORT AND LONG TERM BENEFITS

PASCO SCHOOL DISTRICT
STATE OF WASHINGTON

An Evaluation of the
Early Child Education
Program for five groups
of children:
- Wave 1 1982-83
- Wave 2 1983-84
- Wave 3 1984-85
- Wave 4 1985-86
- Wave 5 1986-87

Plus a followup
evaluation at the
end of kindergarten
for Waves 1,2,3,4
and
at the end of first
grade for Waves 1,2

Prepared by Dr. Beverly McConnell
External Evaluator

Evaluation office: SW 615 Cityview,
Pullman, WA 99163 509-334-2750

## EXECUTIVE SUMMARY

This report is a rarity among educational evaluations in that it represents five replications - analysis of gains by children in five consecutive years in a preschool program. Secondly, it provides followup data on how these children are progressing after they leave the program.

The primary findings are as follows:

The program is reaching the right children, i.e. children very low in preacademic skills and language proficiency in English. Average pretest scores compared to the lowest 1/5th of children in the national norm group in math and the lowest 1/3rd of children in reading readiness.

The program is achieving its primary purpose. The extra year of preschool has improved English vocabulary scores significantly, particularly in the 1986-87 year when the increase was 14 points (the standard deviation on this test is 15 points, and an increase of 1/3rd of a standard deviation, or 5 points, would be considered educationally significant.)

The ECE program is strongest in the area of math skills. This is the area where children consistently make the largest gains.

Changes appear to have been made in the kindergarten curriculum so that it now sustains and increases the ECE target children's academic readiness skills. When the first wave of ECE children showed a drop in standard score in kindergarten in 1984, the District set up a taskforce on Early Childhood Education which has been reviewing and initiating changes in the kindergarten program.

The follow-up scores of children indicate an extremely successful intervention. Children who were severely disadvantaged when taken into the ECE program have scores near national norms by the end of first grade.

## INTRODUCTION

The ECE program, (Early Childhood Education) in the Pasco School District (State of Washington) is designed for four and five year old children considered to be "at risk" of school failure. It serves children many of whom come from homes in which the home language is not English, and from families where poverty and other conditions may limit opportunities to develop preacademic and language skills in the preschool years.

Support for this preschool program comes from a combination of local district and federal funding. There are two facilities and the eligibility and program at these two sites differ in some respects as noted below.

Eligibility for the program at the Emerson school facility is determined primarily on the basis of limited English proficiency for the "at risk" children. This program also serves some children not considered "at risk", who serve as language models. Children are bussed in from all parts of the district. Two half day sessions are held, one in the morning and another in the afternoon. These sessions are staffed by a bilingual certified teacher, and bilingual paraprofessional aides.

The other ECE program is carried out at St. James church -- a facility rented by the district, located in a poverty section of Pasco. Children in this program are mostly "walkers", all come from the immediate neighborhood, and are eligible primarily on the basis of poverty. As in the Emerson school program, some of the ECE children at St. James are Hispanic children with limited proficiency in English. There are also many black children and some white, all from poverty homes. The non-Hispanic children enrolled are all native speakers of English, and for this reason no additional children have been recruited for this program specifically as language models.

The children in the St. James program attend all day. The School District provides a certified teacher for the educational portion of the program during the morning. Local paraprofessionals serve as aides in the morning session, and then stay with the children through lunch and for the remainder of the day providing child care until the children return home. The first year of program evaluation (WAVE 1, 1982-83) only the Emerson school program was included in the evaluation. Since then the ECE program evaluation has included both the St.James and the Emerson school programs.

## PROGRAM DESCRIPTION

The staff/child ratio is approximately 1 teacher or aide for each eight children. Aides are teaching aides and participate fully in the instructional program. The daily program alternates large group and small group activities, with a good deal of individualization of instruction. There are several short, teacher-directed, "work" periods during the day in which children are learning preacademic skills mostly in small group settings. All children spend part of their day working under the teacher and part under aides. There is a lot of opportunity for children to talk to each other and to the teachers, and many activities designed to promote language comprehension and use. Compared to other preschool program models, the Pasco ECE program would be considered a relatively "structured" preschool program, in that it has many teacher-directed activities, with a lesser period of time in which children are in self selected free-play activities.

## THE FOLLOW-UP STUDY

As the district was interested in the long term effects of the preschool program, the evaluation has done follow-up testing at the end of kindergarten beginning with the first wave of children who finished kindergarten in 1984, and with the second, third and fourth wave of children who finished kindergarten in 1985, 1986 and 1987. The first two waves of children were also tested at the end of first grade in 1985 and 1986. First grade follow-up testing was not carried out in 1987.

The results of this follow-up study provide the "long term effects" of the ECE program, which constitutes the second part of this evaluation.

## EVALUATION FINDINGS

### EVALUATION QUESTION -- IS THE PROGRAM REACHING THE RIGHT CHILDREN?

The table below shows the entry level scores of children in prereading and premath. The scores are reported as "standard scores", e.g. the correct number of answers that child has given is compared to the answers of children in a national norm group. The table below shows the standard scores in the fall when children were first starting their year in ECE. Next to the standard score is a percentile indicating what percent of children in the national sample had a score that low or lower.

TABLE 1

FALL PRETEST SCORES IN MATH AND READING READINESS SKILLS
FOR CHILDREN ENROLLED AS 'AT RISK' CHILDREN

| WAVE - ECE SCHOOL YEAR | | | PREREADING | | PREMATH | |
|---|---|---|---|---|---|---|
| | | Number* | Standard Score | National Percentile | Standard Score | National Percentile |
| Wave 1 | 1982-83 | 24 | 88.3 | 21st | 86.5 | 19th |
| Wave 2 | 1983-84 | 50 | 89.4 | 23rd | 83.6 | 14th |
| Wave 3 | 1984-85 | 47 | 84.7 | 16th | 76.8 | 6th |
| Wave 4 | 1985-86 | 47 | 92.7 | 32nd | 83.8 | 14th |
| Wave 5 | 1986-87 | 41 | 93.0 | 32nd | 81.0 | 10th |

FALL PRETEST SCORES IN MATH AND READING READINESS SKILLS
FOR CHILDREN ENROLLED AS 'LANGUAGE MODELS'

| | | | | | | |
|---|---|---|---|---|---|---|
| Wave 1 | 1982-83 | 14 | 101.8 | 55th | 96.9 | 42nd |
| Wave 2 | 1983-84 | 14 | 101.2 | 55th | 100.6 | 53rd |
| Wave 3 | 1984-85 | 12 | 94.3 | 34th | 84.2 | 16th |
| Wave 4 | 1985-86 | 12 | 102.3 | 58th | 100.3 | 50th |
| Wave 5 | 1986-87 | 7 | 108.3 | 70th | 104.6 | 63rd |

* Number includes only those children with both pre and post tests.

As shown in Table 1, the at risk children had pretest scores in math which consistently compared to the scores of the lowest fifth of children tested nationally. Their reading readiness scores compared to the lowest third of children in the national norm group. The mainstream children, recruited as "language models", on the other hand, have scores clustered around 100 which represesnts the national norm on these tests.

WAVE 3 (1984-85) represented a year in which all children recruited were especially low in the readiness skills. Wave 3 children were somewhat younger than children in other years. Wave 4 and 5 children have somewhat higher pretest scores than earlier waves, which may reflect some changes in recuitment procedures or policies. Overall, however, these pretest scores indicate that the program is serving the "right children", e.g. children with real deficits in academic readiness who would benefit from an extra year of preschool.

Children served by the ECE program also enter the program very low in language proficiency. The Emerson school ECE program is focused on children 'at risk' because they come from Spanish speaking homes. The St. James ECE program serves some Spanish speaking children, but is also open to any neighborhood child considered 'at risk' because of poverty. This difference in recruitment priorities is reflected in the entry level scores in English shown in Table 2 below.

TABLE 2

AVERAGE PRETEST SCORES IN ENGLISH VOCABULARY FOR ECE CHILDREN

| WAVE OR SCHOOL YEAR | ST. JAMES | EMERSON SCHOOL PROGRAM | |
|---|---|---|---|
| | At risk children | At risk children | "Language Models' |
| Wave 1 1982-83 | ** | 42.0 | 93.9 |
| Wave 2 1983-84 | 81.9 | 59.1 | 92.5 |
| Wave 3 1984-85 | 70.6 | 45.0 | 99.1 |
| Wave 4 1985-86 | 78.9 | 53.9 | 100.4 |
| Wave 5 1986-87 | 54.5 | 54.3 | 105.4 |

** Not included in the evaluation of ECE for 1982-83.

The vocabulary scores reported in Table 2 are standard scores in which 100 represents the national "norm" for native English speaker of that age in the norming sample. As shown in Table 2, the mainstream children selected as "language models" for the Emerson ECE program tend to cluster around 100, the national norm. The poverty level children from St. James tend to be lower in English vocabulary than the "language model" children, but to have higher scores than at Emerson where nearly all the children were recruited because of low proficiency in English. Overall, the level of vocabulary in English of the "at risk" children served in the ECE program would compare to the lowest 10 percent of children in the English speaking norm group for this test.

CONCLUSION: THE ECE PROGRAM IS REACHING THE 'RIGHT' CHILDREN. THESE ARE CHILDREN WHO ARE 'AT RISK' OF SCHOOL FAILURE BECAUSE OF LOW ACADEMIC READINESS SKILLS, AND VERY LOW LEVELS OF ENGLISH LANGUAGE PROFICIENCY.

EVALUTION QUESTION: DOES THE YEAR IN ECE PRODUCE SIGNIFICANT IMPROVEMENT IN CHILDREN'S ACADEMIC READINESS AND LANGUAGE PROFICIENCY?

## FINDINGS

Table 3, below, shows children's pre and post test scores on the three areas of academic readiness measured: prereading, premath, and handwriting. All scores are standard scores for the "at risk" children enrolled in ECE.

TABLE 3

| WAVE OR SCHOOL YEAR | PREREADING | | | PREMATH | | | HANDWRITING | | |
|---|---|---|---|---|---|---|---|---|---|
| | Pre | Post | Gain | Pre | Post | Gain | Pre | Post | Gain |
| Wave 1 1983-83 | 88.3 | 96.3 | +8.0 | 96.5 | 99.6 | +13.1 | 75.3 | 89.6 | +14.3 |
| Wave 2 1983-84 | 89.4 | 92.9 | +3.5 | 83.6 | 92.8 | + 9.2 | 75.9 | 89.3 | +13.4 |
| Wave 3 1984-85 | 84.7 | 96.3 | +6.9 | 76.8 | 93.3 | +16.5 | 75.9 | 91.0 | +15.1 |
| Wave 4 1985-86 | 92.7 | 95.0 | +2.3 | 83.8 | 92.8 | + 9.0 | 75.9 | 89.3 | +13.4 |
| Wave 5 1986-87 | 93.0 | 92.5 | -0.5 | 81.0 | 94.1 | +13.1 | 85.4 | 88.4 | + 3.0 |

A test of statistical significance of gains was made for Wave 4, 1985-86 and Wave 5, 1986-87. This test measures the probability that this much gain could have been achieved by chance. For Wave 4, gains in all three subjects, reading, math and handwriting were large enough to be statistically significant. For Wave 5, there was no gain in reading, but the gains in math and handwriting were statistically significant.

All of these gain scores were based on standard scores, e.g. the child's score in relationship to that of other children of that age. In all cases, even reading, there was a gain in raw score (number correct) from fall to spring testing. In the case of the reading subtest for Wave 5 children, this gain in raw score was not as much as the raw score gain made by children in the national norming sample -- it therefore results in a slight "loss" in terms of the standard score, or the relationship between the score of that child to other children at that age level.

The ECE program appears to be most effective in teaching premath skills. Children also improve significantly in their visual-motor coordination skills as measured by the handwriting test. The program appears least effective in teaching pre-reading skills. The WAVE 5 group of children is the first one since the program evaluation was started in 1982-83, in which children showed an actual loss in terms of standard score in reading. Analyzing the scores separately by schools, whatever change may have occured in program appears to be at Emerson. Children at Emerson school showed an average loss of 1.7 points in 1986-87 reading scores, while those at St. James showed an average gain of 2.8 points in 1986-87.

Table 4, below, shows the program's effectiveness in terms of gains in English language proficiency (as measured by a vocabulary test.)

TABLE 4

STANDARD SCORE GAINS IN ENGLISH VOCABULARY BY ECE CHILDREN

| WAVE OR SCHOOL YEAR | AT RISK CHILDREN | | | | LANGUAGE MODEL CHILDREN | | | |
|---|---|---|---|---|---|---|---|---|
| | N. | Pre | Post | Gain | N. | Pre | Post | Gain |
| Wave 1 1982-83 | 24 | 42.0 | 55.4 | +13.4 | 14 | 93.9 | 100.3 | +6.4 |
| Wave 2 1983-84 | 45 | 66.2 | 74.0 | + 7.8 | 14 | 92.5 | 95.6 | +3.1 |
| Wave 3 1984-85 | 47 | 52.7 | 58.0 | + 5.3 | 12 | 99.1 | 104.9 | +5.8 |
| Wave 4 1985-86 | 47 | 61.2 | 66.9 | + 5.6 | 12 | 100.4 | 102.3 | +1.9 |
| Wave 5 1986-87 | 41 | 52.7 | 66.9 | +14.2 | 7 | 105.4 | 104.6 | -0.1 |

The U.S. Office of Education uses a rule of thumb that a gain in standard score (i.e. relative standing to other children of the same age level) that exceeds one/third standard deviation is educationally significant. (On this test the standard deviation is 15, so one/third a standard deviation would be 5 points.) As shown above, the gain in English vocabulary for children in all years exceeds this standard.

Tests of statistical significance were done for children in Wave 4 and Wave 5 (other waves of children have been reported on in earlier evaluations). The gain in English vocabulary for both years was large enough to be statistically significant at a high level (e.g. probability

TABLE 5

AVERAGE STANDARD SCORES OF ECE CHILDREN THRU KINDERGARTEN AND FIRST GRADE

| Subject/Wave | Scores of 'at risk' children | | | | Scores of 'language models' | | | |
|---|---|---|---|---|---|---|---|---|
| | START OF ECE | END OF ECE | END OF KINDER | END OF FIRST | START OF ECE | END OF ECE | END OF KINDER | END OF FIRST |
| READING | | | | | | | | |
| WAVE 1 82-83 | 88 | 96 | 93 | 97 | 102 | 106 | 98 | 100 |
| WAVE 2 83-84 | 89 | 93 | 95 | 97 | 101 | 106 | 104 | 111 |
| WAVE 3 84-85 | 85 | 96 | 98 | | 94 | 106 | 104 | |
| WAVE 4 85-86 | 93 | 95 | 99 | | 103 | 106 | 107 | |
| WAVE 5 86-87 | 93 | 93 | | | 108 | 109 | | |
| MATH | | | | | | | | |
| WAVE 1 82-83 | 87 | 97 | 94 | 100 | 97 | 106 | 102 | 103 |
| WAVE 2 83-84 | 84 | 93 | 95 | 106 | 101 | 106 | 108 | 113 |
| WAVE 3 84-85 | 77 | 97 | 99 | | 84 | 106 | 100 | |
| WAVE 4 85-86 | 84 | 95 | 99 | | 100 | 106 | 103 | |
| WAVE 5 86-87 | 81 | 93 | | | 105 | 109 | | |
| HANDWRITING /SPELLING | | | | | | | | |
| WAVE 1 82-83 | 75 | 90 | 91 | 94 | 86 | 99 | 93 | 94 |
| WAVE 2 83-84 | 76 | 89 | 90 | 96 | 88 | 101 | 100 | 108 |
| WAVE 3 84-85 | 76 | 91 | 97 | | 81 | 100 | 92 | |
| WAVE 4 85-86 | 76 | 89 | 91 | | 81 | 100 | 97 | |
| WAVE 5 86-87 | 85 | 88 | | | | | | |
| ENGLISH VOCABULARY | | | | | | | | |
| WAVE 1 82-83 | 52 | 55 | 77 | 85 | 94 | 100 | 106 | 109 |
| WAVE 2 83-84 | 66 | 74 | 88 | 96 | 93 | 96 | 103 | 101 |
| WAVE 3 84-85 | 53 | 58 | 82 | | 99 | 105 | 112 | |
| WAVE 4 85-86 | 61 | 67 | 79 | | 100 | 102 | 98 | |
| WAVE 5 86-87 | 53 | 67 | | | 105 | 105 | | |

In standard scores with a mean of 100, children with scores ranging from 90 through 110, e.g. from the 25th percentile to the 75th percentile that this much gain would occur by chance is less than one in 100.)

Children enrolled as language models also made gains in English vocabulary as would be expected. As shown in Table 2, the scores of mainstream "language model" children tend to cluster around 100 which is the national norm for this age. In most cases, the program gains of the at risk children exceeded that of the language models, which means that the extra year of preschool was bringing at risk children up closer to national norms; they were 'closing the gap.'

CONCLUSION: THE ECE PROGRAM IS PRODUCING SIGNIFICANT GAINS IN BOTH ENGLISH PROFICIENCY AND IN PREACADEMIC SKILLS DURING THE ECE YEAR.

## THE FOLLOWUP STUDY

Successive groups of ECE children who have remained in the Pasco school system have been tested at the end of kindergarten and first grade to see how well the gains of ECE hold up in kindergarten, and how well the child is progressing through the regular school system by the end of first grade.

Four years follow-up data is now available for ECE Waves 1 through 4 at the end of kindergarten, and Waves 1 and 2 were followed up in first grade. No follow up testing for Wave 3 was carried out at the first grade level in 1987.

EVALUATION QUESTION: HOW ARE CHILDREN WHO HAD AN EXTRA YEAR OF PRESCHOOL IN ECE PROGRESSING THROUGH THE SCHOOL SYSTEM IN KINDERGARTEN AND IN FIRST GRADE?

Follow-up testing in kindergarten and first grade is shown in Table 5 on the following page.

are considered to be in the "average range. As shown in Table 5, nearly all waves of children scored below this average range in all readiness skill areas when they started in ECE. By the end of the year in ECE, their average scores had risen to over 90, and were therefore in the "low average" range. Their scores have continued to rise in reference to the national norms so that by the end of first grade the first two waves of ECE children had achieved a reading standard score of 97, and Wave 3 and 4 had reading scores of 98 and 99 by the end of kindergarten. This is a very significant increase in reading readiness -- which is perhaps the most critical subject in determining later academic success.

In math, the gains were even more impressive. Children entered the program with even lower readiness skills than in reading. All were in a "normal range" by the end of the ECE year. And children in Wave 1 reached the national norm of 100 by the end of first grade, Wave 2 children exceeded the national average at the end of first grade. Waves 3 and 4 both showed an average score of 99, just one point below the national average by the end of kindergarten.

The Handwriting/spelling subtest shows a similar progression. The comparative low level of these scores even for the mainstream children enrolled as language models probably reflects the fact that the handwriting test calls for judgement in which responses would be considered correct or incorrect, and the standard used by testers for the Pasco ECE program has been relatively 'strict'. The overall level of scores on this test is less important than the pattern of change from one test period to another which indicates significant improvement through the program.

The gains in English vocabulary are extremely impressive. A three year gain from 52 to 85, and from 66 to 96 means that children's English vocabulary score has increased by two standard deviations from when they started the ECE program. Such a rapid gain is both educationally and statistically significant. It means that by means of an effective program in preschool and kindergarten children have made up a large deficiency in English language skills.

Norms for Hispanic children on this test differ from the norms for native English speakers. Based on Hispanic norms, an average score between 80 and 90 would be in the normal range (comparable to scores of 95 to 105 for native English speakers.) Since nearly all of the children in Wave 1 were Hispanic, the 85 represents achievement of a level normal for their age group. Wave 2 included a mixture of Hispanic and native English speaking children (with the inclusion of the St. James group in the evaluation) so their initial scores were higher, and the score of 96 at the end of first grade also represents achievement of an age appropriate score on this language test.

CONCLUSION: THE GAINS MADE IN THE ECE YEAR ARE MAINTAINED IN KINDERGARTEN AND FIRST GRADE. THE CHILDREN TESTED AT THE END OF FIRST GRADE HAD ACADEMIC AND LANGUAGE ACHIEVEMENT NORMAL TO THEIR AGE GROUP AT FIRST GRADE. CHILDREN WHO STARTED WITH A VERY LARGE DEFICIT OF SKILLS HAD OVERCOME THIS DISADVANTAGE AND WERE DEMONSTRATING ACHIEVEMENT EQUIVALENT OF THEIR PEERS.

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